UNIT INFORMATION

100184
Revised 02/2025

ZCD SERIES
3 to 6 ton
5 to 30 kW

Service Literature

ZCD036 through 074 with R454B

The ZCD 3, 4, 5, and 6 ton (036, 048, 060, 074) packaged electric units are available in standard cooling efficiency.

All ZCD units are designed to accept any of several different energy management thermostat control systems with minimum field wiring. Factory or field provided control options connect to the unit with jack plugs. When ”plugged in” the controls become an integral part of the unit wiring.

Optional electric heat is field-installed. Electric heat operates in single or multiple stages depending on the kW input size. 5kW to 30kW heat sections are available for ZCD units.

Information contained in this manual is intended for use by qualified service technicians only. All specifications are subject to change. Procedures outlined in this manual are presented as a recommendation only and do not supersede or replace local or state codes.

If the unit must be lifted for service, rig unit by attaching four cables to the holes located in the unit base rail (two holes at each corner). Refer to the installation instructions for the proper rigging technique.

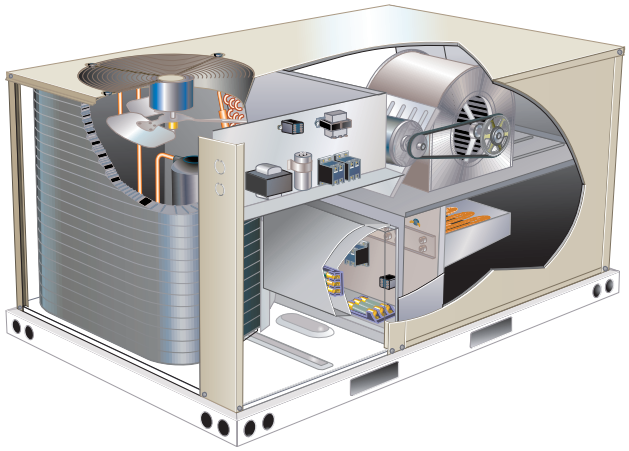
False ceilings or drop ceiling may be used as a return air plenum only if the unit being installed has a Refrigerant Detection System installed.

All maintenance staff and others working in the local area shall be instructed on the nature of work being carried out with work in confined spaces being avoided.

Ensure that the area is in the open or that it is adequately ventilated before breaking into the system or conducting any hot work. A degree of ventilation shall continue during the period that the work is carried out. The ventilation should safely disperse any released refrigerant and preferably expel it externally into the atmosphere.

⚠ WARNING

Improper installation, adjustment, alteration, service or maintenance can cause property damage, personal injury or loss of life. Installation and service must be performed by a licensed professional HVAC installer or equivalent service agency.



⚠ WARNING

Electric shock hazard. Can cause injury or death. Before attempting to perform any service or maintenance, turn the electrical power to unit OFF at disconnect switch(es). Unit may have multiple power supplies.

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⚠ CAUTION

As with any mechanical equipment, contact with sharp sheet metal edges can result in personal in jury. Take care while handling this equipment and wear gloves and protective clothing.

⚠ WARNING

Only manufacturer approved auxiliary devices are permitted to be installed in this unit.

⚠ CAUTION

The appliance is not to be used by persons (including children) with reduced physical, sensory or mental capabilities, or lack of experience and knowledge, unless they have been given supervision or instruction

⚠ CAUTION

Children should be supervised not to play with the appliance.

⚠ CAUTION

Any personnel installing, decommissioning, or performaing maintenance on the unit must be properly trained with A2L refrigerants.

⚠ CAUTION

Servicing shall be performed only as recommended by the manufacturer.

⚠ WARNING

•This appliance must be installed in accordance with local and national wiring regulations.

•If the appliance is not fitted with an option for full disconnection from power, a means of disconnection must be incorporated in the fixed wiring in accordance with national and local wiring regulations.

⚠ CAUTION

Leak Detection System installed. Unit must be powered except for service.

⚠ WARNING

Ducts connected to an appliance shall not contain a potential ignition source.

⚠ IMPORTANT

Pipe work, including piping material, pipe routing, and installation shall include protection from physical damage in operation and service, and be in compliance with national and local codes and standards, such as ASHRAE 15, ASHRAE 15.2, IAPMO Uniform Mechanical Code, ICC International Mechanical Code, or CSA B52. All field joints shall be accessible for inspection prior to being covered or enclosed.

⚠ IMPORTANT

Refrigerant sensors for refrigerant detection systems shall only be replaced with sensors specified by the appliance manufacture.

⚠ CAUTION

This unit is equipped with electrically powered safety measures. To be effective, the unit must be electrically powered at all times after installation, other than when servicing.

⚠ WARNING

To prevent serious injury or death:

1- Lock-out/tag-out before performing maintenance.

2- If system power is required (e.g., smoke detector maintenance), disable power to blower, remove fan belt where applicable, and ensure all controllers and thermostats are set to the “OFF” position before performing maintenance.

3- Always keep hands, hair, clothing, jewelry, tools, etc., away from moving parts.

OPTIONS / ACCESSORIES

Item		Order Number	Size 036	048	060	074
COOLING SYSTEM						
Condensate Drain Trap	PVC	**38R23**	X	X	X	X
	Copper	**38V21**	X	X	X	X
Drain Pan Overflow Switch		**38A64**	X	X	X	X
Low Ambient Kit		**99W67**	X	X	X	X
BLOWER - SUPPLY AIR						
Motors	Belt Drive - .75 HP (203/230V-1ph)	Factory	O			
	Belt Drive - 1 HP (208/230V, 460V, 575V-3ph)	Factory	O	O		
	Belt Drive - 1.5 HP (208/230V-1ph)	Factory		O	O	
	Belt Drive - 1.5 HP (208/230V, 460V, 575V-3ph)	Factory			O	
	Belt Drive - 2 HP (208/230V, 460V, 575V-3ph) (2 Speed)	Factory				O
Drive Kits See Blower Data Tables for selection	Kit #ZA01 - 678-1035 rpm	Factory	O			
	Kit #ZA02 - 803-1226 rpm	Factory		O		
	Kit #ZA03 - 906-1383 rpm	Factory			O	
	Kit #ZA04 - 964-1471 rpm	Factory	O			
	[1] Kit #ZA05 -1098-1490 rpm	Factory		O	O	
	Kit #ZAA02 - 632-875 rpm	Factory				O
	Kit #ZAA03 - 798-1105 rpm	Factory				O
	Kit #ZAA04 - 921-1226 rpm	Factory				O
CABINET						
Coil/Hail Guards		**12X19**	X	X		
		12X20			X	X
Corrosion Protection		Factory	O	O	O	O
ELECTRICAL						
Voltage 60 Hz	208/230V - 1 phase	Factory	O	O	O	
	208/230V - 3 phase	Factory	O	O	O	O
	460V - 3 phase	Factory	O	O	O	O
	575V - 3 phase	Factory	O	O	O	O
Bottom Power Entry Kit		**98W08**	X	X	X	X

[1].5 HP blower motor is required with the ZA05 drive kit.

NOTE - The catalog numbers that appear here are for ordering field installed accessories only.

OX - Field Installed or Configure to Order (factory installed)

O - Configure to Order (Factory Installed)

X - Field Installed.

OPTIONS / ACCESSORIES

Item		Order Number	Size 036	048	060	074
ELECTRIC HEAT						
5 kW	208/240V-1ph	**30U97**	X	X	X	
	208/240V-3ph	**30U98**	X	X	X	
	460V-3ph	**30U99**	X	X	X	
	575V-3ph	**30V01**	X	X	X	
7.5 kW	208/240V-1ph	**30V02**	X	X	X	
	208/240V-3ph	**30V03**	X	X	X	X
	460V-3ph	**30V04**	X	X	X	X
	575V-3ph	**30V05**	X	X	X	X
10 kW	208/240V-1ph	**30V06**	X	X	X	
	208/240V-3ph	**30V07**	X	X	X	X
	460V-3ph	**30V08**	X	X	X	X
	575V-3ph	**30V09**	X	X	X	X
15 kW	208/240V-1ph	**30V10**	X	X	X	
	208/240V-3ph	**30V11**	X	X	X	X
	460V-3ph	**30V12**	X	X	X	X
	575V-3ph	**30V13**	X	X	X	X
22.5 kW	208/240V-1ph	**30V14**		X	X	
	208/240V-3ph	**30V15**		X	X	X
	460V-3ph	**30V16**		X	X	X
	575V-3ph	**30V17**		X	X	X
30 kW	208/240V-3ph	**30V18**				X
	460V-3ph	**30V19**				X
	575V-3ph	**30V20**				X
ELECTRIC HEAT ACCESSORIES						
Unit Fuse Block (required) - See Electrical/Electric Heat Tables for Selection			X	X	X	X

NOTE - The catalog numbers that appear here are for ordering field installed accessories only.
OX - Field Installed or Configure to Order (factory installed)
O - Configure to Order (Factory Installed)
X - Field Installed.

OPTIONS / ACCESSORIES

Item		Order Number	Size 036	048	060	074
ECONOMIZER						
Standard Economizer With Outdoor Air Hood (Not for Title 24)						
Standard Economizer (Downflow) Includes Barometric Relief Dampers and Exhaust Hood		**14D94**	X	X	X	X
Standard Economizer (Horizontal) Includes Barometric Relief Dampers and Exhaust Hood		**14D92**	X	X	X	X
Standard Economizer Controls (Not for Title 24)						
Single Enthalpy Control		**21Z09**	X	X	X	X
High Performance Economizer (Sensible Control) (Approved for California Title 24 Building Standards / AMCA Class 1A Certified)						
High Performance Economizer (Downflow) Includes Barometric Relief Dampers and Exhaust Hood		**24J59**	X	X	X	X
High Performance Economizer (Horizontal) Includes Barometric Relief Dampers and Exhaust Hood		**24J60**	X	X	X	X
High Performance Economizer Controls						
Single Enthalpy Control		**24G11**	X	X	X	X
Economizer Accessories						
WLAN Stick (For High Performance Economizer only)		**23K58**	X	X	X	X
OUTDOOR AIR						
Outdoor Air Dampers With Outdoor Air Hood						
Motorized		**15D19**	X	X	X	X
Manual		**15D20**	X	X	X	X
POWER EXHAUST FAN						
Standard Static (Downflow)	208/230V-1 or 3ph	**21E01**	X	X	X	X
Standard Static (Horizontal)	208/230V-1 or 3ph	**24E01**	X	X	X	X
575V Transformer Kit		**59E02**	X	X	X	X
INDOOR AIR QUALITY						
Indoor Air Quality (CO_2) Sensors						
Sensor - Wall-mount, off-white plastic cover with LCD display		**24C58**	X	X	X	X
Sensor - Wall-mount, black plastic case, no display, rated for plenum mounting		**23V87**	X	X	X	X
CO_2 Sensor Duct Mounting Kit - for downflow applications		**23Y47**	X	X	X	X
Aspiration Box - for duct mounting non-plenum rated CO_2 sensor (**24C58**)		**90N43**	X	X	X	X
ROOF CURBS						
Hybrid Roof Curbs, Downflow						
8 in. height		**11F76**	X	X	X	X
14 in. height		**11F77**	X	X	X	X
18 in. height		**11F78**	X	X	X	X
24 in. height		**11F79**	X	X	X	X
CEILING DIFFUSERS						
Step-Down - Order one	RTD9-65S	**13K60**	X	X	X	
	RTD11-95S	**13K61**				X
Flush - Order one	FD9-65S	**13K55**	X	X	X	
	FD11-95S	**13K56**				X

NOTE - Ceiling Diffuser Transitions are not furnished and must be field fabricated.
NOTE - Order 575V Transformer Kit with 208/230V Power Exhaust Fan for 575V applications.

NOTE - The catalog numbers that appear here are for ordering field installed accessories only.

OX - Field Installed or Configure to Order (factory installed)

O - Configure to Order (Factory Installed)

X - Field Installed.

SPECIFICATIONS

Model			ZCD036S5B	ZCD048S5B	ZCD060S5B	ZCD074S5T
Nominal Tonnage			3	4	5	6
Efficiency Type			Standard	Standard	Standard	Standard
Blower Type			Single Speed Belt Drive	Single Speed Belt Drive	Single Speed Belt Drive	Two Speed Belt Drive
Cooling Performance	Gross Cooling Capacity (Btuh)		36,200	46,700	58,300	68,500
	[1] Net Cooling Capacity (Btuh)		35,000	45,500	57,000	67,000
	[1] AHRI Rated Air Flow (cfm)		1190	1380	1725	2200
	[1] SEER2 (Btuh/Watt)		13.4	13.4	13.4	- - -
	[1] EER2 (Btuh/Watt)		11.5	11.5	11.5	- - -
	[1] IEER (Btuh/Watt)		- - -	- - -	- - -	15.5
	[1] EER (Btuh/Watt)		- - -	- - -	- - -	11.2
	Total Unit Power (kW)		3.0	4.1	5.0	5.8
Sound Rating Number		dBA	78	80	78	84
Refrigerant		Type	R-454B	R-454B	R-454B	R-454B
		Charge Furnished	4 lbs. 1 oz.	4 lbs. 4 oz.	4 lbs. 10 oz.	5 lbs. 0 oz.
Electric Heat Available - page 27			5, 7.5, 10, 15 kW	5, 7.5, 10, 15, 22.5 kW		7.5, 15, 22.5, 30 kW
Compressor Type (one per unit)			Single-Stage Scroll (1)	Single-Stage Scroll (1)	Single-Stage Scroll (1)	Two-Stage Scroll (1)
Outdoor Coil	Net face area - ft.[2]		15.2	15.2	19.9	19.9
	Rows		1	1	1	1
	Fins - in.		23	23	23	23
Outdoor Coil Fan	Motor HP (number and type)		(1) 1/4	(1) 1/4	(1) 1/4	(1) 1/3
	Rpm		825	825	825	1075
	Watts		315	315	315	365
	Diameter (Number) - in.		(1) 22	(1) 22	(1) 22	(1) 22
	Blades		4	4	4	3
	Total air volume - cfm		3700	3700	3700	4270
Indoor Coil	Net face area - ft.[2]		7.2	7.2	7.2	9.5
	Rows		1	1	1	1
	Fins - in.		18	18	18	18
	Condensate drain size (NPT) - in.		(1) 3/4	(1) 3/4	(1) 3/4	(1) 3/4
	Expansion device type		Balanced Port Thermostatic Expansion Valve			
[2] **Indoor Blower & Drive Selection**	Nominal Motor HP	1ph	0.75	1.5	1.5	- - -
		3ph	1	1	1.5	2
	Maximum Usable Motor HP (US)		0.86, 1.15	1.7, 1.15	1.7	2.3
	Available Drive Kits		Kit #ZA01 678-1035 rpm Kit #ZA04 964-1471 rpm	Kit #ZA02 803-1226 rpm [3] Kit #ZA05 1098-1490 rpm	Kit #ZA03 906-1383 rpm [3] Kit #ZA05 1098-1490 rpm	Kit #ZAA02 632-875 rpm Kit #ZAA03 798-1105 rpm Kit #ZAA04 921-1228 rpm
	Wheel (Number) diameter x width - in.		(1) 10 x 10	(1) 10 x 10	(1) 10 x 10	(1) 15 x 9
Filters		Type	Disposable			
		Number and size - in.	(4) 14 x 20 x 2		(2) 16 x 20 x 2 (2) 20 x 20 x 2	
Line voltage data (Volts-Phase-Hz)			208/230-1-60 208/230-3-60 460-3-60 575-3-60	208/230-1-60 208/230-3-60 460-3-60 575-3-60	208/230-1-60 208/230-3-60 460-3-60 575-3-60	208/230-3-60 460-3-60 575-3-60

NOTE - Net capacity includes evaporator blower motor heat deduction. Gross capacity does not include evaporator blower motor heat deduction.

[1] AHRI Certified to AHRI Standard 210/240 or 340/360: 95°F outdoor air temperature and 80°F db/67°F wb entering evaporator air; minimum external duct static pressure.

[2] Using total air volume and system static pressure requirements determine from blower performance tables rpm and motor HP required. Maximum usable HP of motors furnished are shown. In Canada, nominal motor HP is also maximum usable motor HP output. If motors of comparable HP are used, be sure to keep within the service factor limitations outlined on the motor nameplate.

[3] .5 HP motor is required with the ZA05 drive kit.

BLOWER TABLE INCLUDES RESISTANCE FOR BASE UNIT ONLY WITH DRY INDOOR COIL AND AIR FILTERS IN PLACE.

FOR ALL UNITS ADD:
1 - Any factory installed options air resistance (heat section, economizer, wet coil, etc.).
2 - Any field installed accessories air resistance (duct resistance, diffuser, etc.).
See page 21 for blower motors and drives and wet coil and options/accessory air resistance data.

DOWNFLOW

Air Volume cfm	External Static - in. w.g.															
	0.10		0.20		0.30		0.40		0.50		0.60		0.70		0.80	
	RPM	BHP	RPM	BHP	RPM	BHP	RPM	BHP	RPM	BHP	RPM	BHP	RPM	BHP	RPM	BHP
900	562	0.16	629	0.18	699	0.19	771	0.20	840	0.22	904	0.24	962	0.26	1015	0.29
1000	586	0.18	654	0.20	725	0.21	796	0.23	864	0.25	927	0.27	983	0.30	1034	0.33
1100	612	0.20	681	0.22	752	0.24	823	0.26	890	0.28	950	0.31	1004	0.34	1054	0.37
1200	641	0.23	711	0.25	783	0.27	852	0.29	917	0.32	975	0.35	1027	0.39	1074	0.42
1300	673	0.25	744	0.28	815	0.30	882	0.33	944	0.36	1000	0.40	1050	0.44	1096	0.48
1400	709	0.29	779	0.32	849	0.34	914	0.37	973	0.41	1026	0.45	1074	0.49	1118	0.53
1500	747	0.33	816	0.36	883	0.39	945	0.42	1001	0.46	1052	0.51	1098	0.55	1141	0.59
Air Volume cfm	External Static - in. w.g.															
	0.90		1.00		1.10		1.20		1.30		1.40		1.50		1.60	
	RPM	BHP	RPM	BHP	RPM	BHP	RPM	BHP	RPM	BHP	RPM	BHP	RPM	BHP	RPM	BHP
900	1065	0.32	1112	0.35	1158	0.38	1202	0.41	1243	0.44	1284	0.48	1323	0.52	1364	0.55
1000	1082	0.36	1128	0.39	1173	0.42	1216	0.45	1257	0.49	1297	0.53	1336	0.57	1375	0.60
1100	1100	0.40	1145	0.44	1189	0.47	1231	0.51	1272	0.54	1311	0.58	1349	0.62	1388	0.66
1200	1119	0.45	1163	0.49	1206	0.52	1247	0.56	1287	0.60	1326	0.64	1364	0.68	1402	0.72
1300	1139	0.51	1182	0.55	1224	0.58	1265	0.62	1304	0.66	1342	0.71	1379	0.75	1416	0.79
1400	1160	0.57	1202	0.61	1243	0.65	1283	0.69	1322	0.73	1359	0.78	1396	0.82	1432	0.87
1500	1182	0.64	1223	0.68	1263	0.72	1303	0.76	1341	0.81	1378	0.85	1414	0.90	1449	0.94

HORIZONTAL

Air Volume cfm	External Static - in. w.g.															
	0.10		0.20		0.30		0.40		0.50		0.60		0.70		0.80	
	RPM	BHP	RPM	BHP	RPM	BHP	RPM	BHP	RPM	BHP	RPM	BHP	RPM	BHP	RPM	BHP
900	580	0.14	649	0.17	721	0.19	794	0.22	868	0.24	938	0.27	998	0.30	1045	0.33
1000	612	0.17	681	0.19	752	0.22	825	0.25	897	0.27	963	0.30	1017	0.33	1061	0.37
1100	647	0.20	717	0.23	788	0.26	858	0.28	926	0.31	986	0.34	1036	0.38	1077	0.41
1200	687	0.23	757	0.26	826	0.29	893	0.32	955	0.35	1008	0.39	1054	0.42	1095	0.46
1300	730	0.27	798	0.30	864	0.33	926	0.37	982	0.40	1030	0.44	1073	0.47	1116	0.51
1400	775	0.31	840	0.34	902	0.38	959	0.42	1009	0.46	1054	0.50	1096	0.53	1140	0.56
1500	820	0.36	881	0.40	939	0.44	993	0.49	1039	0.53	1082	0.56	1124	0.59	1168	0.62
Air Volume cfm	External Static - in. w.g.															
	0.90		1.00		1.10		1.20		1.30		1.40		1.50		1.60	
	RPM	BHP	RPM	BHP	RPM	BHP	RPM	BHP	RPM	BHP	RPM	BHP	RPM	BHP	RPM	BHP
900	1091	0.36	1140	0.38	1188	0.40	1232	0.43	1272	0.46	1309	0.49	1346	0.53	1383	0.57
1000	1105	0.40	1154	0.42	1201	0.45	1245	0.47	1284	0.50	1321	0.54	1357	0.58	1394	0.62
1100	1121	0.44	1169	0.47	1216	0.49	1259	0.52	1298	0.56	1335	0.60	1370	0.64	1406	0.69
1200	1139	0.49	1187	0.52	1234	0.54	1276	0.58	1314	0.62	1350	0.66	1385	0.71	1421	0.75
1300	1161	0.54	1208	0.57	1254	0.60	1295	0.64	1332	0.69	1366	0.73	1401	0.78	1436	0.83
1400	1185	0.59	1232	0.63	1276	0.67	1315	0.71	1351	0.76	1384	0.81	1419	0.86	1454	0.90
1500	1212	0.66	1257	0.70	1299	0.74	1337	0.79	1371	0.84	1404	0.89	1438	0.94	1473	0.99

BLOWER TABLE INCLUDES RESISTANCE FOR BASE UNIT ONLY WITH DRY INDOOR COIL AND AIR FILTERS IN PLACE.

FOR ALL UNITS ADD:
1 - Any factory installed options air resistance (heat section, economizer, wet coil, etc.).
2 - Any field installed accessories air resistance (duct resistance, diffuser, etc.).
See page 21 for blower motors and drives and wet coil and options/accessory air resistance data.

DOWNFLOW

Air Volume cfm	External Static - in. w.g.															
	0.10		0.20		0.30		0.40		0.50		0.60		0.70		0.80	
	RPM	BHP	RPM	BHP	RPM	BHP	RPM	BHP	RPM	BHP	RPM	BHP	RPM	BHP	RPM	BHP
1200	641	0.23	711	0.25	783	0.27	852	0.29	917	0.32	975	0.35	1027	0.39	1074	0.42
1300	673	0.25	744	0.28	815	0.30	882	0.33	944	0.36	1000	0.40	1050	0.44	1096	0.48
1400	709	0.29	779	0.32	849	0.34	914	0.37	973	0.41	1026	0.45	1074	0.49	1118	0.53
1500	747	0.33	816	0.36	883	0.39	945	0.42	1001	0.46	1052	0.51	1098	0.55	1141	0.59
1600	787	0.38	854	0.41	918	0.44	976	0.48	1030	0.52	1078	0.56	1123	0.61	1164	0.66
1700	827	0.43	892	0.46	952	0.49	1007	0.53	1058	0.58	1105	0.63	1148	0.68	1189	0.73
1800	868	0.48	929	0.52	986	0.55	1038	0.59	1087	0.64	1132	0.69	1174	0.75	1214	0.80
1900	907	0.54	966	0.58	1019	0.62	1069	0.66	1116	0.71	1160	0.77	1200	0.82	1240	0.88
2000	946	0.60	1001	0.65	1053	0.69	1101	0.74	1146	0.79	1188	0.85	1228	0.91	1267	0.98

Air Volume cfm	External Static - in. w.g.															
	0.90		1.00		1.10		1.20		1.30		1.40		1.50		1.60	
	RPM	BHP	RPM	BHP	RPM	BHP	RPM	BHP	RPM	BHP	RPM	BHP	RPM	BHP	RPM	BHP
1200	1119	0.45	1163	0.49	1206	0.52	1247	0.56	1287	0.60	1326	0.64	1364	0.68	1402	0.72
1300	1139	0.51	1182	0.55	1224	0.58	1265	0.62	1304	0.66	1342	0.71	1379	0.75	1416	0.79
1400	1160	0.57	1202	0.61	1243	0.65	1283	0.69	1322	0.73	1359	0.78	1396	0.82	1432	0.87
1500	1182	0.64	1223	0.68	1263	0.72	1303	0.76	1341	0.81	1378	0.85	1414	0.9	1449	0.94
1600	1205	0.70	1245	0.75	1284	0.79	1323	0.84	1361	0.88	1397	0.93	1432	0.98	1467	1.03
1700	1228	0.78	1268	0.82	1307	0.87	1345	0.92	1382	0.97	1417	1.02	1452	1.07	1486	1.11
1800	1253	0.85	1292	0.91	1331	0.96	1368	1.01	1404	1.06	1439	1.11	1473	1.16	1506	1.21
1900	1279	0.94	1317	1.00	1355	1.05	1392	1.10	1427	1.16	1461	1.21	1494	1.26	1527	1.31
2000	1305	1.04	1343	1.10	1380	1.15	1416	1.21	1450	1.26	1484	1.32	1516	1.37	1549	1.42

HORIZONTAL

Air Volume cfm	External Static - in. w.g.															
	0.10		0.20		0.30		0.40		0.50		0.60		0.70		0.80	
	RPM	BHP	RPM	BHP	RPM	BHP	RPM	BHP	RPM	BHP	RPM	BHP	RPM	BHP	RPM	BHP
1200	687	0.23	757	0.26	826	0.29	893	0.32	955	0.35	1008	0.39	1054	0.42	1095	0.46
1300	730	0.27	798	0.30	864	0.33	926	0.37	982	0.40	1030	0.44	1073	0.47	1116	0.51
1400	775	0.31	840	0.34	902	0.38	959	0.42	1009	0.46	1054	0.50	1096	0.53	1140	0.56
1500	820	0.36	881	0.40	939	0.44	993	0.49	1039	0.53	1082	0.56	1124	0.59	1168	0.62
1600	864	0.42	921	0.46	976	0.51	1027	0.56	1072	0.6	1113	0.63	1155	0.66	1198	0.69
1700	907	0.48	961	0.53	1013	0.58	1061	0.63	1105	0.67	1146	0.70	1187	0.73	1230	0.77
1800	948	0.56	999	0.61	1049	0.66	1096	0.71	1139	0.75	1180	0.78	1221	0.82	1262	0.86
1900	987	0.64	1037	0.69	1086	0.74	1132	0.79	1174	0.83	1214	0.86	1255	0.90	1295	0.95
2000	1028	0.73	1076	0.78	1123	0.83	1168	0.87	1210	0.91	1250	0.96	1289	1.00	1328	1.06

Air Volume cfm	External Static - in. w.g.															
	0.90		1.00		1.10		1.20		1.30		1.40		1.50		1.60	
	RPM	BHP	RPM	BHP	RPM	BHP	RPM	BHP	RPM	BHP	RPM	BHP	RPM	BHP	RPM	BHP
1200	1139	0.49	1187	0.52	1234	0.54	1276	0.58	1314	0.62	1350	0.66	1385	0.71	1421	0.75
1300	1161	0.54	1208	0.57	1254	0.60	1295	0.64	1332	0.69	1366	0.73	1401	0.78	1436	0.83
1400	1185	0.59	1232	0.63	1276	0.67	1315	0.71	1351	0.76	1384	0.81	1419	0.86	1454	0.90
1500	1212	0.66	1257	0.70	1299	0.74	1337	0.79	1371	0.84	1404	0.89	1438	0.94	1473	0.99
1600	1242	0.73	1284	0.77	1324	0.82	1360	0.88	1394	0.93	1426	0.99	1460	1.04	1495	1.08
1700	1272	0.81	1312	0.86	1350	0.92	1385	0.98	1418	1.04	1451	1.09	1485	1.14	1519	1.19
1800	1302	0.90	1341	0.96	1377	1.02	1411	1.08	1444	1.15	1477	1.20	1510	1.25	1544	1.30
1900	1334	1.01	1371	1.07	1406	1.13	1439	1.20	1471	1.26	1504	1.32	1537	1.37	1571	1.41
2000	1365	1.12	1401	1.19	1435	1.25	1468	1.32	1500	1.38	1532	1.44	1565	1.49	1598	1.53

BLOWER TABLE INCLUDES RESISTANCE FOR BASE UNIT ONLY WITH DRY INDOOR COIL AND AIR FILTERS IN PLACE.

FOR ALL UNITS ADD:

1 - Any factory installed options air resistance (heat section, economizer, wet coil, etc.).

2 - Any field installed accessories air resistance (duct resistance, diffuser, etc.).

See page 21 for blower motors and drives and wet coil and options/accessory air resistance data.

DOWNFLOW

Air Volume cfm	External Static - in. w.g.															
	0.10		0.20		0.30		0.40		0.50		0.60		0.70		0.80	
	RPM	BHP	RPM	BHP	RPM	BHP	RPM	BHP	RPM	BHP	RPM	BHP	RPM	BHP	RPM	BHP
1600	764	0.46	823	0.51	882	0.56	940	0.60	997	0.65	1048	0.69	1094	0.72	1140	0.75
1700	806	0.53	863	0.58	919	0.62	975	0.67	1028	0.71	1075	0.75	1119	0.78	1164	0.81
1800	849	0.60	903	0.65	957	0.69	1010	0.74	1058	0.78	1102	0.82	1145	0.85	1189	0.88
1900	892	0.68	944	0.72	995	0.77	1045	0.82	1089	0.86	1131	0.89	1174	0.92	1217	0.95
2000	935	0.76	984	0.81	1033	0.86	1079	0.91	1122	0.95	1163	0.97	1204	1.00	1247	1.03
2100	977	0.85	1024	0.90	1070	0.95	1114	1.00	1155	1.03	1196	1.06	1237	1.09	1278	1.12
2200	1018	0.95	1063	0.99	1107	1.04	1149	1.09	1190	1.12	1230	1.15	1270	1.18	1310	1.22
2300	1057	1.04	1100	1.09	1143	1.14	1185	1.18	1225	1.22	1264	1.25	1303	1.29	1342	1.33
2400	1096	1.14	1137	1.18	1179	1.23	1220	1.27	1260	1.31	1299	1.35	1337	1.40	1375	1.45
Air Volume cfm	**External Static - in. w.g.**															
	0.90		**1.00**		**1.10**		**1.20**		**1.30**		**1.40**		**1.50**		**1.60**	
	RPM	**BHP**	**RPM**	**BHP**	**RPM**	**BHP**	**RPM**	**BHP**	**RPM**	**BHP**	**RPM**	**BHP**	**RPM**	**BHP**	**RPM**	**BHP**
1600	1185	0.79	1229	0.81	1271	0.84	1313	0.86	1354	0.90	1393	0.94	1431	0.98	1468	1.03
1700	1208	0.84	1252	0.87	1294	0.90	1335	0.94	1375	0.98	1413	1.02	1449	1.07	1485	1.12
1800	1233	0.91	1276	0.94	1318	0.98	1358	1.02	1397	1.06	1434	1.11	1469	1.16	1504	1.21
1900	1261	0.98	1303	1.02	1343	1.06	1382	1.11	1420	1.16	1455	1.21	1490	1.26	1525	1.31
2000	1289	1.07	1330	1.11	1370	1.16	1407	1.21	1444	1.27	1478	1.32	1513	1.37	1547	1.42
2100	1319	1.16	1359	1.21	1397	1.27	1433	1.32	1468	1.38	1502	1.44	1536	1.49	1570	1.53
2200	1350	1.27	1388	1.32	1424	1.38	1459	1.45	1494	1.51	1527	1.56	1561	1.61	1594	1.65
2300	1380	1.38	1417	1.45	1452	1.51	1486	1.58	1520	1.63	1553	1.68	1587	1.73	1620	1.78
2400	1411	1.51	1446	1.58	1480	1.65	1514	1.71	1547	1.77	1580	1.81	1614	1.86	1648	1.90

HORIZONTAL

Air Volume cfm	External Static - in. w.g.															
	0.10		0.20		0.30		0.40		0.50		0.60		0.70		0.80	
	RPM	BHP	RPM	BHP	RPM	BHP	RPM	BHP	RPM	BHP	RPM	BHP	RPM	BHP	RPM	BHP
1600	752	0.40	818	0.45	882	0.50	943	0.55	999	0.59	1050	0.62	1097	0.66	1142	0.69
1700	792	0.46	855	0.52	917	0.56	975	0.61	1028	0.64	1077	0.68	1123	0.72	1166	0.75
1800	832	0.53	894	0.58	952	0.63	1007	0.67	1058	0.70	1105	0.74	1149	0.78	1192	0.82
1900	873	0.60	932	0.65	988	0.69	1040	0.73	1088	0.77	1134	0.81	1177	0.85	1219	0.90
2000	914	0.67	970	0.72	1023	0.76	1073	0.80	1120	0.85	1163	0.89	1205	0.94	1246	0.99
2100	955	0.74	1009	0.79	1059	0.84	1107	0.89	1152	0.93	1194	0.98	1235	1.03	1275	1.09
2200	995	0.83	1047	0.88	1095	0.93	1141	0.98	1184	1.03	1225	1.08	1265	1.14	1304	1.20
2300	1036	0.92	1085	0.97	1132	1.02	1175	1.08	1217	1.13	1257	1.19	1296	1.26	1334	1.32
2400	1077	1.01	1124	1.07	1168	1.13	1210	1.19	1251	1.25	1290	1.32	1328	1.39	1365	1.46
Air Volume cfm	**External Static - in. w.g.**															
	0.90		**1.00**		**1.10**		**1.20**		**1.30**		**1.40**		**1.50**		**1.60**	
	RPM	**BHP**	**RPM**	**BHP**	**RPM**	**BHP**	**RPM**	**BHP**	**RPM**	**BHP**	**RPM**	**BHP**	**RPM**	**BHP**	**RPM**	**BHP**
1600	1185	0.72	1228	0.75	1270	0.79	1310	0.83	1349	0.88	1387	0.93	1423	0.98	1459	1.03
1700	1209	0.78	1251	0.82	1292	0.87	1331	0.92	1370	0.97	1407	1.02	1443	1.07	1478	1.12
1800	1234	0.86	1275	0.91	1315	0.96	1354	1.01	1391	1.06	1428	1.11	1463	1.17	1498	1.22
1900	1260	0.95	1300	1.00	1340	1.05	1377	1.11	1414	1.16	1450	1.22	1485	1.27	1519	1.32
2000	1287	1.04	1326	1.10	1365	1.16	1402	1.21	1437	1.27	1472	1.33	1507	1.38	1541	1.43
2100	1314	1.15	1353	1.21	1391	1.27	1427	1.33	1462	1.39	1496	1.44	1530	1.50	1564	1.55
2200	1343	1.26	1381	1.33	1417	1.39	1453	1.45	1487	1.51	1521	1.56	1555	1.62	1589	1.67
2300	1372	1.39	1409	1.45	1445	1.52	1480	1.58	1513	1.64	1547	1.69	1580	1.75	1614	1.80
2400	1402	1.52	1438	1.59	1473	1.65	1507	1.71	1541	1.77	1574	1.83	1607	1.88	1641	1.93

BLOWER TABLE INCLUDES RESISTANCE FOR BASE UNIT ONLY WITH DRY INDOOR COIL AND AIR FILTERS IN PLACE.

FOR ALL UNITS ADD:
1 - Any factory installed options air resistance (heat section, economizer, wet coil, etc.).
2 - Any field installed accessories air resistance (duct resistance, diffuser, etc.).
See page 21 for blower motors and drives and wet coil and options/accessory air resistance data.

DOWNFLOW

Air Volume	External Static - in. w.g.															
	0.10		0.20		0.30		0.40		0.50		0.60		0.70		0.80	
cfm	RPM	BHP	RPM	BHP	RPM	BHP	RPM	BHP	RPM	BHP	RPM	BHP	RPM	BHP	RPM	BHP
1900	578	0.44	610	0.49	643	0.54	678	0.60	714	0.65	749	0.70	785	0.76	819	0.82
2000	600	0.50	632	0.56	665	0.61	699	0.66	734	0.71	769	0.77	803	0.83	837	0.90
2100	623	0.57	655	0.62	688	0.68	721	0.73	755	0.79	789	0.84	822	0.91	854	0.98
2200	647	0.65	678	0.70	711	0.75	743	0.81	776	0.86	809	0.93	841	1.00	872	1.06
2300	671	0.73	702	0.78	734	0.83	766	0.89	798	0.95	829	1.02	860	1.09	890	1.16
2400	696	0.81	726	0.87	757	0.92	788	0.98	819	1.04	850	1.11	880	1.19	909	1.26
2500	720	0.90	750	0.95	780	1.01	811	1.07	841	1.14	871	1.22	900	1.30	929	1.37
2600	745	0.99	774	1.05	804	1.11	834	1.17	864	1.25	893	1.33	921	1.41	949	1.49
2700	770	1.09	799	1.15	828	1.21	858	1.28	887	1.36	916	1.44	943	1.53	969	1.61
2800	795	1.19	824	1.25	853	1.33	882	1.40	911	1.48	939	1.56	965	1.65	990	1.73
2900	820	1.30	849	1.37	878	1.45	907	1.53	935	1.61	962	1.70	988	1.78	1012	1.86

Air Volume	External Static - in. w.g.															
	0.90		1.00		1.10		1.20		1.30		1.40		1.50		1.60	
cfm	RPM	BHP	RPM	BHP	RPM	BHP	RPM	BHP	RPM	BHP	RPM	BHP	RPM	BHP	RPM	BHP
1900	853	0.88	885	0.94	915	0.99	944	1.05	971	1.11	996	1.17	1021	1.23	1045	1.29
2000	869	0.96	899	1.01	929	1.07	957	1.13	984	1.19	1009	1.25	1033	1.31	1058	1.38
2100	885	1.04	915	1.10	944	1.15	971	1.22	997	1.28	1022	1.34	1046	1.40	1070	1.46
2200	902	1.13	931	1.19	959	1.24	986	1.31	1012	1.37	1036	1.43	1060	1.50	1084	1.56
2300	920	1.23	948	1.29	975	1.35	1001	1.41	1027	1.47	1051	1.53	1075	1.60	1098	1.66
2400	938	1.33	965	1.39	992	1.45	1017	1.52	1042	1.58	1066	1.64	1090	1.70	1113	1.77
2500	956	1.44	983	1.51	1009	1.57	1034	1.63	1059	1.69	1082	1.75	1105	1.82	1128	1.88
2600	975	1.56	1001	1.63	1026	1.69	1051	1.75	1075	1.81	1098	1.87	1121	1.93	1143	2.00
2700	995	1.68	1020	1.75	1044	1.81	1069	1.87	1092	1.93	1114	1.99	1136	2.06	1158	2.13
2800	1015	1.81	1039	1.87	1063	1.94	1086	2.00	1109	2.06	1131	2.12	1152	2.19	1174	2.26
2900	1035	1.94	1058	2.00	1081	2.07	1104	2.13	1126	2.19	1147	2.26	1168	2.33	1189	2.40

HORIZONTAL

Air Volume	External Static - in. w.g.															
	0.10		0.20		0.30		0.40		0.50		0.60		0.70		0.80	
cfm	RPM	BHP	RPM	BHP	RPM	BHP	RPM	BHP	RPM	BHP	RPM	BHP	RPM	BHP	RPM	BHP
1900	581	0.44	618	0.49	655	0.54	692	0.59	729	0.64	765	0.69	800	0.75	833	0.80
2000	602	0.50	639	0.55	676	0.61	713	0.66	749	0.71	784	0.76	818	0.82	850	0.88
2100	625	0.57	661	0.62	698	0.67	735	0.73	770	0.78	804	0.84	837	0.90	868	0.96
2200	648	0.64	685	0.69	721	0.75	757	0.80	791	0.86	824	0.92	856	0.98	886	1.05
2300	673	0.71	709	0.77	745	0.83	780	0.88	813	0.94	845	1.01	876	1.08	905	1.15
2400	699	0.79	734	0.85	769	0.91	803	0.97	835	1.04	866	1.11	896	1.18	924	1.25
2500	725	0.88	759	0.94	793	1.00	826	1.07	857	1.14	887	1.21	916	1.28	944	1.36
2600	752	0.97	785	1.04	818	1.10	850	1.17	880	1.25	909	1.32	937	1.40	964	1.48
2700	779	1.07	811	1.14	843	1.21	873	1.29	902	1.37	931	1.44	958	1.52	984	1.60
2800	805	1.18	837	1.26	868	1.33	897	1.41	925	1.49	952	1.57	979	1.66	1004	1.74
2900	832	1.30	863	1.38	892	1.46	921	1.54	948	1.63	974	1.71	1000	1.80	1024	1.88

Air Volume	External Static - in. w.g.															
	0.90		1.00		1.10		1.20		1.30		1.40		1.50		1.60	
cfm	RPM	BHP	RPM	BHP	RPM	BHP	RPM	BHP	RPM	BHP	RPM	BHP	RPM	BHP	RPM	BHP
1900	864	0.87	895	0.93	924	0.99	953	1.06	980	1.12	1007	1.18	1032	1.25	1056	1.31
2000	881	0.95	911	1.01	940	1.08	967	1.14	994	1.21	1020	1.27	1044	1.34	1068	1.40
2100	898	1.03	927	1.10	955	1.17	982	1.23	1008	1.30	1033	1.37	1057	1.43	1080	1.50
2200	916	1.12	944	1.19	971	1.26	998	1.33	1023	1.40	1047	1.47	1071	1.54	1093	1.60
2300	934	1.22	961	1.29	988	1.36	1014	1.43	1038	1.50	1062	1.58	1085	1.65	1107	1.71
2400	952	1.32	979	1.40	1005	1.47	1030	1.54	1054	1.62	1077	1.69	1099	1.76	1121	1.83
2500	971	1.43	997	1.51	1022	1.59	1046	1.66	1069	1.74	1092	1.81	1114	1.88	1135	1.95
2600	990	1.55	1015	1.63	1039	1.71	1063	1.79	1086	1.86	1108	1.94	1129	2.01	1150	2.07
2700	1009	1.68	1034	1.76	1057	1.84	1080	1.92	1102	1.99	1124	2.07	1145	2.14	1166	2.21
2800	1028	1.82	1052	1.9	1075	1.98	1097	2.06	1119	2.13	1140	2.21	1161	2.28	1182	2.34
2900	1048	1.96	1071	2.04	1093	2.12	1115	2.20	1136	2.28	1157	2.35	1177	2.42	1198	2.48

BLOWER DATA

BELT DRIVE KIT SPECIFICATIONS - ZCD036-060

Model	Motor HP		Voltage	Speeds	Drive Kits and RPM Range				
	Nominal	Maximum			ZA01	ZA02	ZA03	ZA04	[1] ZA05
ZCD036	0.75	0.86	208/230V-1ph	1	678 - 1035	- - -	- - -	964 - 1471	- - -
	1	1.15	208/230V-3ph	1	678 - 1035	- - -	- - -	964 - 1471	- - -
ZCD048	1	1.15	208/230V-3ph	1	- - -	803 - 1226	- - -	- - -	- - -
	1.5	1.7	208/230V-1ph	1	- - -	803 - 1226	- - -	- - -	1098 - 1490
ZCD060	1.5	1.7	208/230V-1 or 3ph	1	- - -	- - -	906 - 1383	- - -	1098 - 1490

BELT DRIVE KIT SPECIFICATIONS - ZCD074

Model	Motor HP		Speeds	Drive Kits and RPM Range		
	Nominal	Maximum		ZAA02	ZAA03	ZAA04
ZCD074S5T	2	2.3	2	632 - 875	798 - 1105	921 - 1228

NOTE - Using total air volume and system static pressure requirements determine from blower performance tables rpm and motor HP required. Maximum usable HP of motors furnished are shown. In Canada, nominal motor HP is also maximum usable motor HP. If motors of comparable HP are used, be sure to keep within the service factor limitations outlined on the motor nameplate.

[1].5 HP blower motor is required with the ZA05 drive kit.

POWER EXHAUST FAN PERFORMANCE

Return Air System Static Pressure - in. w.g.	Air Volume Exhausted cfm
0.00	1865
0.05	1785
0.10	1710
0.15	1630
0.20	1545
0.25	1450
0.30	1350
0.35	1240

BLOWER DATA

OPTIONS / ACCESSORIES AIR RESISTANCE - in. w.g.

Air Volume cfm	Wet Indoor Coil		Electric Heat	Economizer	
	ZCD036, ZCD048	ZCD060, ZCD074		Downflow	Horizontal
900	0.01	- - -	0.05	0.03	0.04
1000	0.02	- - -	0.06	0.03	0.05
1100	0.02	- - -	0.08	0.04	0.05
1200	0.02	- - -	0.09	0.05	0.06
1300	0.03	- - -	0.12	0.05	0.07
1400	0.03	- - -	0.17	0.06	0.08
1500	0.04	- - -	0.22	0.07	0.08
1600	0.04	0.03	0.26	0.08	0.09
1700	0.05	0.03	0.30	0.09	0.10
1800	0.05	0.03	0.33	0.10	0.11
1900	0.06	0.04	0.33	0.11	0.12
2000	0.06	0.04	0.31	0.12	0.13
2100	- - -	0.05	0.27	0.13	0.14
2200	- - -	0.05	0.29	0.14	0.15
2300	- - -	0.05	0.31	0.15	0.16
2400	- - -	0.06	0.32	0.16	0.18
2500	- - -	0.06	0.34	0.18	0.19
2600	- - -	0.07	0.38	0.19	0.20
2700	- - -	0.07	0.42	0.20	0.21
2800	- - -	0.07	0.45	0.22	0.23
2900	- - -	0.08	0.49	0.23	0.24

BLOWER DATA

CEILING DIFFUSERS AIR RESISTANCE (in. w.g.)

Air Volume cfm	RTD9-65S Step–Down Diffuser			FD9-65S Flush Diffuser	RTD11-95S Step–Down Diffuser			FD11-95S Flush Diffuser
	2 Ends Open	1 Side & 2 Ends Open	All Ends & Sides Open		2 Ends Open	1 Side & 2 Ends Open	All Ends & Sides Open	
800	0.15	0.13	0.11	0.11	- - -	- - -	- - -	- - -
1000	0.19	0.16	0.14	0.14	- - -	- - -	- - -	- - -
1200	0.25	0.20	0.17	0.17	- - -	- - -	- - -	- - -
1400	0.33	0.26	0.20	0.20	- - -	- - -	- - -	- - -
1600	0.43	0.32	0.20	0.24	- - -	- - -	- - -	- - -
1800	0.56	0.40	0.30	0.30	0.13	0.11	0.09	0.09
2000	0.73	0.50	0.36	0.36	0.15	0.13	0.11	0.10
2200	0.95	0.63	0.44	0.44	0.18	0.15	0.12	0.12
2400	- - -	- - - -	- - -	- - -	0.21	0.18	0.15	0.14
2600	- - -	- - - -	- - -	- - -	0.24	0.21	0.18	0.17
2800	- - -	- - - -	- - -	- - -	0.27	0.24	0.21	0.20
3000	- - -	- - - -	- - -	- - -	0.32	0.29	0.25	0.25
3200	- - -	- - - -	- - -	- - -	0.41	0.37	0.32	0.31
3400	- - -	- - - -	- - -	- - -	0.50	0.45	0.39	0.37
3600	- - -	- - - -	- - -	- - -	0.61	0.54	0.48	0.44

CEILING DIFFUSER AIR THROW DATA

Air Volume - cfm	[1] Effective Throw - ft.	
Model	**RTD9-65S**	**FD9-65S**
800	10 - 17	14 - 18
1000	10 - 17	15 - 20
1200	11 - 18	16 - 22
1400	12 - 19	17 - 24
1600	12 - 20	18 - 25
1800	13 - 21	20 - 28
2000	14 - 23	21 - 29
2200	16 - 25	22 - 30
Model	**RTD11-95S**	**FD11-95S**
2600	24 - 29	19 - 24
2800	25 - 30	20 - 28
3000	27 - 33	21 - 29
3200	28 - 35	22 - 29
3400	30 - 37	22 - 30
3600	25 - 33	22 - 24

[1] Effective throw based on terminal velocities of 75 ft. per minute.

ELECTRICAL/ELECTRIC HEAT DATA — 3 TON

Model			ZCD036S5			
[1] Voltage - 60Hz			208/230V - 1 Ph	208/230V - 3 Ph	460V - 3 Ph	575V - 3 Ph
Compressor (Non-Inverter)	Rated Load Amps		14.4	9	4.1	3.3
	Locked Rotor Amps		86	70	39	29
Outdoor Fan Motor	Full Load Amps (1 Non-ECM)		1.7	1.7	0.9	0.7
Power Exhaust (1) 0.33 HP	Full Load Amps		2.4	2.4	1.3	1
Indoor Blower Motor	Horsepower		0.75	1	1	1
	Full Load Amps		5.4	4.6	2.1	1.7
[2] Maximum Overcurrent Protection (MOCP)	Unit Only		35	25	15	15
	With (1) 0.33 HP Power Exhaust		40	25	15	15
[3] Minimum Circuit Ampacity (MCA)	Unit Only		26	18	9	7
	With (1) 0.33 HP Power Exhaust		28	20	10	8

ELECTRIC HEAT DATA

Electric Heat Voltage			208	240	208	240	480	600
[2] Maximum Overcurrent Protection (MOCP)	Unit+ Electric Heat	**5 kW**	35	35	25	25	15	15
		7.5 kW	45	50	30	30	15	15
		10 kW	60	60	35	40	20	15
		15 kW	80	90	45	60	30	25
[3] Minimum Circuit Ampacity (MCA)	Unit+ Electric Heat	**5 kW**	30	33	19	21	11	9
		7.5 kW	41	46	26	29	14	12
		10 kW	52	59	32	36	18	15
		15 kW	75	85	45	51	26	21
[2] Maximum Overcurrent Protection (MOCP)	Unit+ Electric Heat and (1) 0.33 HP Power Exhaust	**5 kW**	40	40	25	25	15	15
		7.5 kW	45	50	30	35	20	15
		10 kW	60	70	35	40	20	20
		15 kW	80	90	50	60	30	25
[3] Minimum Circuit Ampacity (MCA)	Unit+ Electric Heat and (1) 0.33 HP Power Exhaust	**5 kW**	33	36	22	24	12	10
		7.5 kW	44	49	29	32	16	13
		10 kW	55	62	35	39	20	16
		15 kW	78	88	48	54	27	22

ELECTRIC HEAT ACCESSORIES

Unit Fuse Block	Unit Only	**10A26**	**10A27**	**10A29**	**10A29**
	Unit + Power Exhaust	**10A26**	**10A27**	**10A29**	**10A29**

NOTE - All units have a minimum Short Circuit Current Rating (SCCR) of 5000 amps.

[1] Extremes of operating range are plus and minus 10% of line voltage.

[2] HACR type breaker or fuse.

[3] Refer to National or Canadian Electrical Code manual to determine wire, fuse and disconnect size requirements.

ELECTRICAL/ELECTRIC HEAT DATA — 4 TON

Model			ZCD048S5			
[1] Voltage - 60Hz			208/230V - 1 Ph	208/230V - 3 Ph	460V - 3 Ph	575V - 3 Ph
Compressor (Non-Inverter)	Rated Load Amps		19.4	12	6.3	4.4
	Locked Rotor Amps		102	123	60	41
Outdoor Fan Motor	Full Load Amps (1 Non-ECM)		1.7	1.7	0.9	0.7
Power Exhaust (1) 0.33 HP	Full Load Amps		2.4	2.4	1.3	1
Indoor Blower Motor	Horsepower		1.5	1	1	1
	Full Load Amps		11	4.6	2.1	1.7
[2] Maximum Overcurrent Protection (MOCP)	Unit Only		50	30	15	15
	With (1) 0.33 HP Power Exhaust		50	35	15	15
[3] Minimum Circuit Ampacity (MCA)	Unit Only		37	22	11	8
	With (1) 0.33 HP Power Exhaust		40	24	13	9

ELECTRIC HEAT DATA

Electric Heat Voltage			208	240	208	240	480	600
[2] Maximum Overcurrent Protection (MOCP)	Unit+ Electric Heat	**5 kW**	50	50	30	30	15	15
		7.5 kW	50	60	30	30	15	15
		10 kW	60	70	35	40	20	15
		15 kW	90	100	45	60	30	25
		22.5 kW	125	150	70	80	40	30
[3] Minimum Circuit Ampacity (MCA)	Unit+ Electric Heat	**5 kW**	37	40	22	22	11	9
		7.5 kW	48	53	26	29	14	12
		10 kW	59	66	32	36	18	15
		15 kW	82	92	45	51	26	21
		22.5 kW	116	131	65	74	37	30
[2] Maximum Overcurrent Protection (MOCP)	Unit+ Electric Heat and (1) 0.33 HP Power Exhaust	**5 kW**	50	50	35	35	15	15
		7.5 kW	60	60	35	35	20	15
		10 kW	70	70	35	40	20	20
		15 kW	90	100	50	60	30	25
		22.5 kW	125	150	70	80	40	35
[3] Minimum Circuit Ampacity (MCA)	Unit+ Electric Heat and (1) 0.33 HP Power Exhaust	**5 kW**	40	43	24	24	13	10
		7.5 kW	51	56	29	32	16	13
		10 kW	62	69	35	39	20	16
		15 kW	85	95	48	54	27	22
		22.5 kW	119	134	68	77	39	31

ELECTRIC HEAT ACCESSORIES

Unit Fuse Block	Unit Only	**10A26**	**10A27**		**10A29**	**10A29**
	Unit + Power Exhaust	**10A26**	**10A27**		**10A29**	**10A29**

NOTE - All units have a minimum Short Circuit Current Rating (SCCR) of 5000 amps.

[1] Extremes of operating range are plus and minus 10% of line voltage.

[2] HACR type breaker or fuse.

[3] Refer to National or Canadian Electrical Code manual to determine wire, fuse and disconnect size requirements.

ELECTRICAL/ELECTRIC HEAT DATA — 5 TON

Model			ZCD060S5			
[1] Voltage - 60Hz			208/230V - 1 Ph	208/230V - 3 Ph	460V - 3 Ph	575V - 3 Ph
Compressor (Non-Inverter)	Rated Load Amps		23.7	16	7.1	6.4
	Locked Rotor Amps		157	156.4	69	47.8
Outdoor Fan Motor	Full Load Amps (1 Non-ECM)		1.7	1.7	0.9	0.7
Power Exhaust (1) 0.33 HP	Full Load Amps		2.4	2.4	1.3	1
Indoor Blower Motor	Horsepower		1.5	1.5	1.5	1.5
	Full Load Amps		11	6.6	3	2.4
[2] Maximum Overcurrent Protection (MOCP)	Unit Only		60	40	15	15
	With (1) 0.33 HP Power Exhaust		60	45	20	15
[3] Minimum Circuit Ampacity (MCA)	Unit Only		43	29	13	12
	With (1) 0.33 HP Power Exhaust		45	31	15	13

ELECTRIC HEAT DATA

Electric Heat Voltage			208	240	208	240	480	600
[2] Maximum Overcurrent Protection (MOCP)	Unit+ Electric Heat	**5 kW**	60	60	40	40	15	15
		7.5 kW	60	60	40	40	20	15
		10 kW	60	70	40	40	20	20
		15 kW	90	100	50	60	30	25
		22.5 kW	125	150	70	80	40	35
[3] Minimum Circuit Ampacity (MCA)	Unit+ Electric Heat	**5 kW**	43	43	29	29	13	12
		7.5 kW	48	53	29	31	16	13
		10 kW	59	66	35	39	19	16
		15 kW	82	92	48	54	27	22
		22.5 kW	116	131	67	76	38	31
[2] Maximum Overcurrent Protection (MOCP)	Unit+ Electric Heat and (1) 0.33 HP Power Exhaust	**5 kW**	60	60	45	45	20	15
		7.5 kW	60	60	45	45	20	15
		10 kW	70	70	45	45	25	20
		15 kW	90	100	60	60	30	25
		22.5 kW	125	150	70	80	40	35
[3] Minimum Circuit Ampacity (MCA)	Unit+ Electric Heat and (1) 0.33 HP Power Exhaust	**5 kW**	45	45	31	31	15	13
		7.5 kW	51	56	31	34	17	14
		10 kW	62	69	38	42	21	17
		15 kW	85	95	51	57	28	23
		22.5 kW	119	134	70	79	40	32

ELECTRIC HEAT ACCESSORIES

Unit Fuse Block	Unit Only	**10A26**	**10A28**		**10A29**	**10A29**
	Unit + Power Exhaust	**10A26**	**10A28**		**10Az29**	**10A29**

NOTE - All units have a minimum Short Circuit Current Rating (SCCR) of 5000 amps.

[1] Extremes of operating range are plus and minus 10% of line voltage.

[2] HACR type breaker or fuse.

[3] Refer to National or Canadian Electrical Code manual to determine wire, fuse and disconnect size requirements.

ELECTRICAL/ELECTRIC HEAT DATA — 6 TON

Model			ZCD074S5T		
[1] Voltage - 60Hz			208/230V - 3 Ph	460V - 3 Ph	575V - 3 Ph
Compressor (Non-Inverter)	Rated Load Amps		19.2	9.1	6.2
	Locked Rotor Amps		162.3	70.8	58.2
Outdoor Fan Motors	Full Load Amps (1 Non-ECM)		1.7	1	0.9
Power Exhaust (1) 0.33 HP	Full Load Amps		2.4	1.3	1
Indoor Blower Motor	Horsepower		2	2	2
	Full Load Amps		7.5	3.4	2.7
[2] Maximum Overcurrent Protection (MOCP)	Unit Only		50	20	15
	with (1) 0.33 HP Power Exhaust		50	25	15
[3] Minimum Circuit Ampacity (MCA)	Unit Only		34	16	12
	with (1) 0.33 HP Power Exhaust		36	18	13
ELECTRIC HEAT DATA					
Electric Heat Voltage			**208V**	**240V**	**480V**	**600V**
[2] Maximum Overcurrent Protection (MOCP)	Unit + Electric Heat	**7.5 kW**	50	50	20	15
		10 kW	50	50	20	20
		15 kW	50	60	30	25
		22.5 kW	70	80	40	35
		30 kW	90	100	50	40
[3] Minimum Circuit Ampacity (MCA)	Unit + Electric Heat	**7.5 kW**	34	34	16	13
		10 kW	36	40	20	16
		15 kW	49	55	27	22
		22.5 kW	69	78	39	31
		30 kW	88	100	50	40
[2] Maximum Overcurrent Protection (MOCP)	Unit+ Electric Heat and (1) 0.33 HP Power Exhaust	**7.5 kW**	50	50	25	15
		10 kW	50	50	25	20
		15 kW	60	60	30	25
		22.5 kW	80	90	40	35
		30 kW	100	110	60	45
[3] Minimum Circuit Ampacity (MCA)	Unit+ Electric Heat and (1) 0.33 HP Power Exhaust	**7.5 kW**	36	36	18	14
		10 kW	39	43	21	17
		15 kW	52	58	29	23
		22.5 kW	72	81	40	32
		30 kW	91	103	51	41
ELECTRICAL ACCESSORIES					
Unit Fuse Block	Unit Only		**10A28**	**10A28**	**10A29**	**10A29**
	Unit + Power Exhaust		**10A28**	**10A28**	**10A29**	**10A29**

NOTE - All units have a minimum Short Circuit Current Rating (SCCR) of 5000 amps.

[1] Extremes of operating range are plus and minus 10% of line voltage.

[2] HACR type breaker or fuse.

[3] Refer to National or Canadian Electrical Code manual to determine wire, fuse and disconnect size requirements.

ELECTRIC HEAT CAPACITIES

Input Voltage	5 kW			7.5 kW			10 kW		
	Stages	kW input	Btuh Output	Stages	kW input	Btuh Output	Stages	kW input	Btuh Output
208	1	3.8	12,800	1	5.6	19,200	1	7.5	25,600
220	1	4.2	14,300	1	6.3	21,500	1	8.4	28,700
230	1	4.6	15,700	1	6.9	23,500	1	9.2	31,400
240	1	5.0	17,100	1	7.5	25,600	1	10.0	34,200
440	1	4.2	14,300	1	6.3	21,500	1	8.4	28,700
460	1	4.6	15,700	1	6.9	23,500	1	9.2	31,400
480	1	5.0	17,100	1	7.5	25,600	1	10.0	34,200
550	1	4.2	14,300	1	6.3	21,500	1	8.4	28,700
575	1	4.6	15,700	1	6.9	23,500	1	9.2	31,400
600	1	5.0	17,100	1	7.5	25,600	1	10.0	34,200
Input Voltage	**15 kW**			**22.5 kW**			**30 kW**		
	Stages	kW input	Btuh Output	Stages	kW input	Btuh Output	Stages	kW input	Btuh Output
208	1	11.2	38,400	1	16.9	57,700	1	22.5	76,800
220	1	12.6	43,000	1	18.9	64,500	1	25.2	86,000
230	1	13.8	47,000	1	20.7	70,700	1	27.5	93,900
240	1	15.0	51,200	1	22.5	76,800	1	30.0	102,400
440	1	12.6	43,000	1	18.9	64,500	1	25.2	86,000
460	1	13.8	47,000	1	20.7	70,700	1	27.5	93,900
480	1	15.0	51,200	1	22.5	76,800	1	30.0	102,400
550	1	12.6	43,000	1	18.9	64,500	1	25.2	86,000
575	1	13.8	47,000	1	20.7	70,700	1	27.5	93,900
600	1	15.0	51,200	1	22.5	76,800	1	30.0	102,400

FIELD WIRING NOTES

- For use with copper wiring only
- Field wiring not furnished
- All wiring must conform to NEC or CEC and local electrical codes
- For specific wiring information, please refer to the installation instructions

OUTDOOR SOUND DATA

Size	Octave Band Sound Power Levels dBA, re 10^{-12} Watts - Center Frequency - Hz							[1] Sound Rating Number dBA
	125	250	500	1000	2000	4000	8000	
036	66	70	73	72	70	67	60	78
048	68	71	75	74	71	68	63	80
060	64	68	72	73	69	67	63	78
074	73	76	80	78	73	68	66	84

[1] Sound Rating Number according to AHRI Standard 270-2008. Sound Rating Number is the overall A-Weighted Sound Power Level, (LWA), dB (100 Hz to 10,000 Hz).

Minimum R454B Space and CFM Requirements

Minimum Airflow[1]		
Unit	Q_{min}(CFM)	Q_{min}(m^3h)
ZCD 036	108	184
ZCD 048	112	191
ZCD 060	122	208
ZCD 074	182	309

Refrigerant Charge R-454B		
Unit	M_c(lbs)	M_c(kg)
ZCD 036	4.10	1.86
ZCD 048	4.25	1.93
ZCD 060	4.63	2.10
ZCD 074	5.00	2.27

*[1] **NOTE -** The minimum airflow is the lowest CFM allowed during venting operation (leak mitigation).*

Minimum Room Area of Conditioned Space[2]		
Unit	TA_{min}(ft^2)	TA_{min}(m^2)
ZCD 036	61	5.6
ZCD 048	63	5.8
ZCD 060	68	6.3
ZCD 074	101	9.4

*[2] **NOTE -** The minimum room area of conditioned space is the smallest area the unit can service.*

Altitude Adjustment Factor[3]									
Halt	0	200	400	600	800	1000	1200	1400	1600
AF	1	1	1	1	1.02	1.05	1.07	1.1	1.12
Halt	1600	1800	2000	2200	2400	2600	2800	3000	3200
AF	1.12	1.15	1.18	1.21	1.25	1.28	1.32	1.36	1.4

*[3] **NOTE -** Use the Altitude Adjustment Factor to adjust the values in the tables above to different altitudes. Find the relevant altitude above sea level in the two "Halt" rows and then multiply the value needed from the tables above by the altitude factor number. Example: For the minimum airflow in CFM for an ZCD036 at 1000 ft. above see lev*el, multiply 108 by 1.05 to get 113.4 CFM a*s the new Q_{min}.*

Parts Arrangement

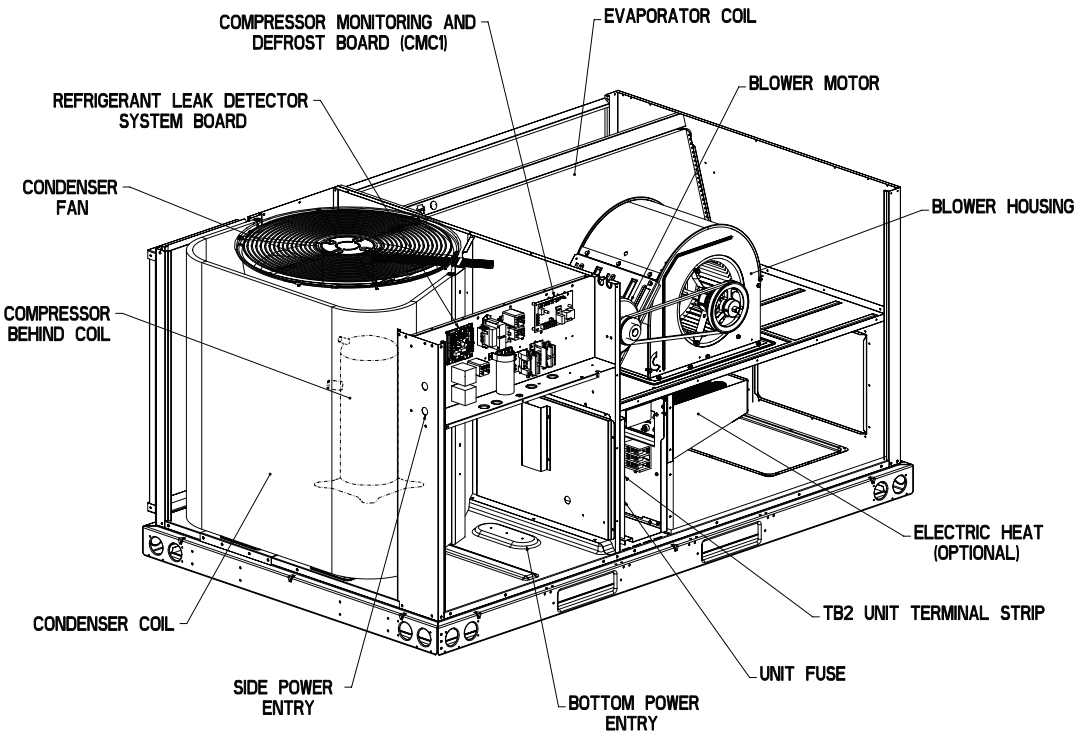


FIGURE 1

ZCD036-060 CONTROL BOX

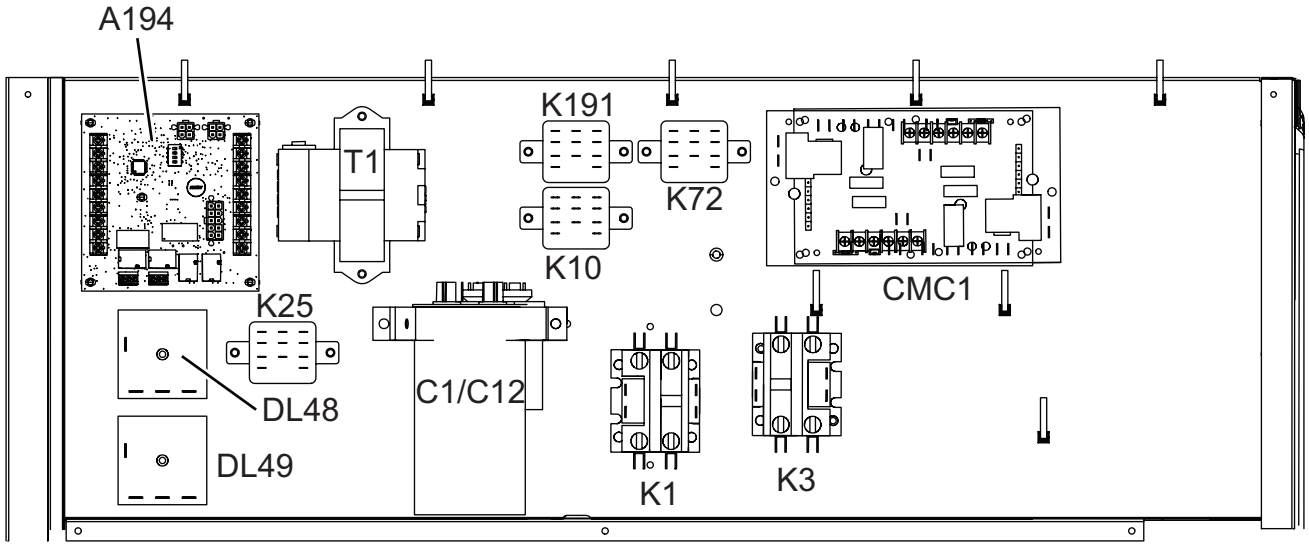


FIGURE 2

ZCD074 CONTROL BOX

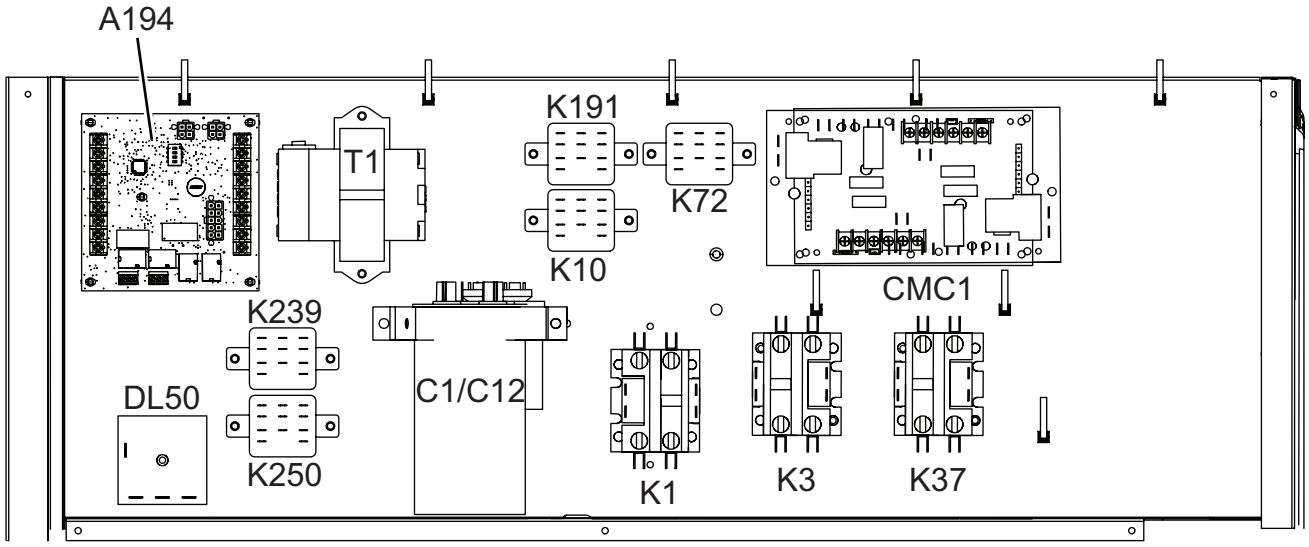


FIGURE 3

I-UNIT COMPONENTS

ELECTROSTATIC DISCHARGE (ESD)
Precautions and Procedures

⚠ CAUTION

Electrostatic discharge can affect electronic components. Take precautions to neutralize electrostatic charge by touching your hand and tools to metal prior to handling the control.

The ZCD unit components are shown in FIGURE 1. All units come standard with removable unit panels. All L1, L2, and L3 wiring is color coded; L1 is red, L2 is yellow, and L3 is blue.

A-Control Box Components

ZCD control box components are shown in FIGURE 2 and FIGURE 3. The control box is in the outdoor section to the left of the blower and heat section.

1-Control Transformer T1

All use a single line voltage to 24VAC transformer mounted in the control box. Transformer supplies power to control circuits in the unit. The transformer is rated at 70VA and is protected by a 3 amp (auto) fuse F1. The 208/230 (Y) voltage transformers use two primary voltage taps as shown in FIGURE 4, while 460 (G) and 575 (J) voltage transformers use a single primary voltage tap.

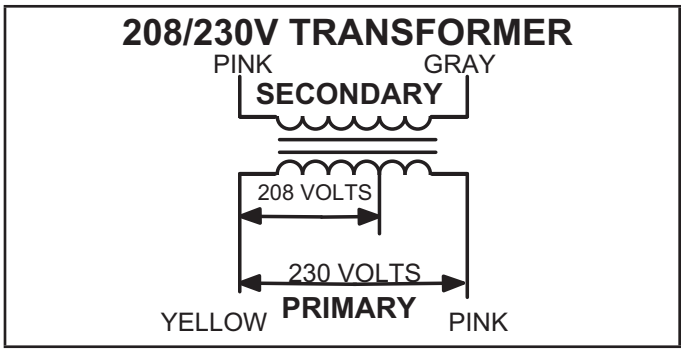


FIGURE 4

2-Fan Capacitor C1 (three phase)

Fan capacitors C1 is used to assist in the start up of condenser fan B4. Ratings will be on side of capacitor or outdoor fan motor nameplate.

3-Dual Capacitor C12 (single phase)

A single dual capacitor is used for both the outdoor fan and compressor (see unit diagram). The fan side and the compressor side have different MFD ratings. See side of capacitor for ratings.

4-Compressor Contactor K1

In all ZCD units, K1 energizes compressors B1 in response to thermostat demand. Three phase units use two pole double break contactors with a 24 volt coil. Single phase units use single pole double break contactors with a 24 volt coil.

5-Blower Contactor K3

On three phase units, K3 is a two pole double-break contactor with a 24VAC coil and on single phase units is a single pole double break contactor with a 24 volt coil. K3 energizes the indoor blower motor B3 in response to stage one blower demand.

6-Blower Contactor K37 (-074 model only)

K37 is a two pole double-break contactor with a 24VAC coil. K37 energizes the indoor blower motor B3 in response to stage 2 blower demand.

7-Crankcase Heater Delay DL48 & Crankcase Heater Relay K191

Delay DL48 and relay K191 keep the crankcase heater de-energized during and immediately following compressor shut down. They ensure the crankcase heater is off while the compressor is energized. DL48 and K191 are used together on ZCD036,-048 and -060 units. K191 is used without DL48 on ZCD074 units.

8-Blower Delay DL49 & Blower Relay K25

Delay DL49 and relay K25 keep the blower energized for 30 seconds immediately following compressor shut down after heating or cooling demand.

9-Blower Delay DL50 (-074 model only)

DL50 causes a 1.5 second delay when switching from high speed (stage 1) to low speed (stage 2).

10-Relay K239 (-074 model only)

Relay K239 sends the “Y1” demand to “G” signal to K3 (through K250) to energize the blower on low speed and also sends the “W1” demand “G” signal to K37 (through K250) to energize the blower on high speed.

11-Relay K250 (-074 model only)

Relay K250 passes “G” signal to contactor K3 energizing the blower on low speed. On a “Y2” call K250 passes the signal to K37 energizing the blower on high speed and internal solenoid L34 energizing the compressor on high speed.

12-Outdoor Fan Relay K10 (G, J voltage)

Outdoor fan relay K10 is an optional, field-installed DPDT relay with a 24VAC coil. K10 relay coil is in series with S11 low ambient pressure switch and cycles B4 outdoor fan via K10-1 N.O. contacts.

13-Exhaust Fan Transformer T10 (J voltage)

Transformer T10 is a field-installed 600/230V transformer which provides power to the 208/230V power exhaust fan in 575V applications.

14-Refrigerant Detection Board (A194) and Sensor (RT58)

This air handler is equipped with a Refrigerant Leak Detection System. The system consists of the RDS Non-Communicating Blower Control Board (A194) in the control compartment and a R454B Refrigerant Sensor (RT58) near the coil.

15-Compressor Monitoring Control Board CMC1

The unit is equipped with a CMC1 control board which has the combined function of anti-short cycle timed off control and high- and low-pressure switch system control. Inputs will include cooling commands and pressure controls.

Integral features include:

- LED diagnostic indicators.
- High- and low-pressure switch monitoring, with 5-strike lockout.

COMPRESSOR MONITORING CONTROL BOARD CMC1

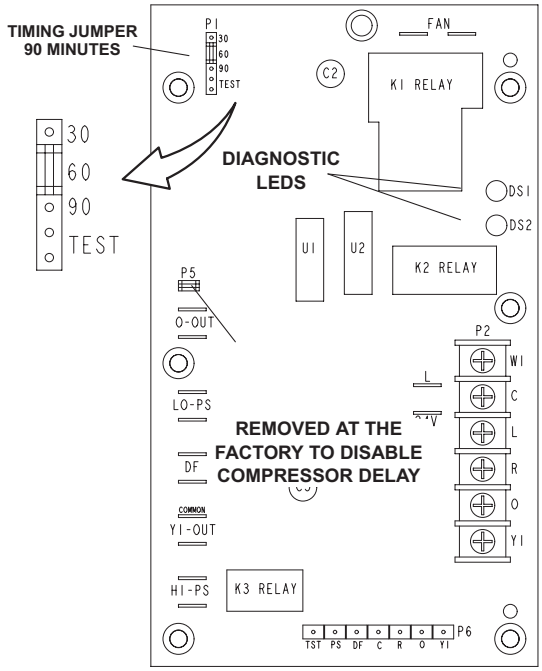


FIGURE 5

Diagnostic LEDs

The defrost board uses two LEDs for diagnostics. The LEDs flash a sequence according to the condition.

TABLE 1

CMC1 Defrost Control Board Diagnostic LED

Mode	Green LED (DS2)	Red LED (DS1)
No power to control	OFF	OFF
Normal operation / power to control	Simultaneous Slow FLASH	
Anti-shot cycle lockout	Alternating Slow FLASH	
High pressure switch fault	Slow FLASH	OFF
High pressure switch lockout	ON	OFF

ZCD PLUMBING AND COMPRESSOR CIRCUIT DETAIL

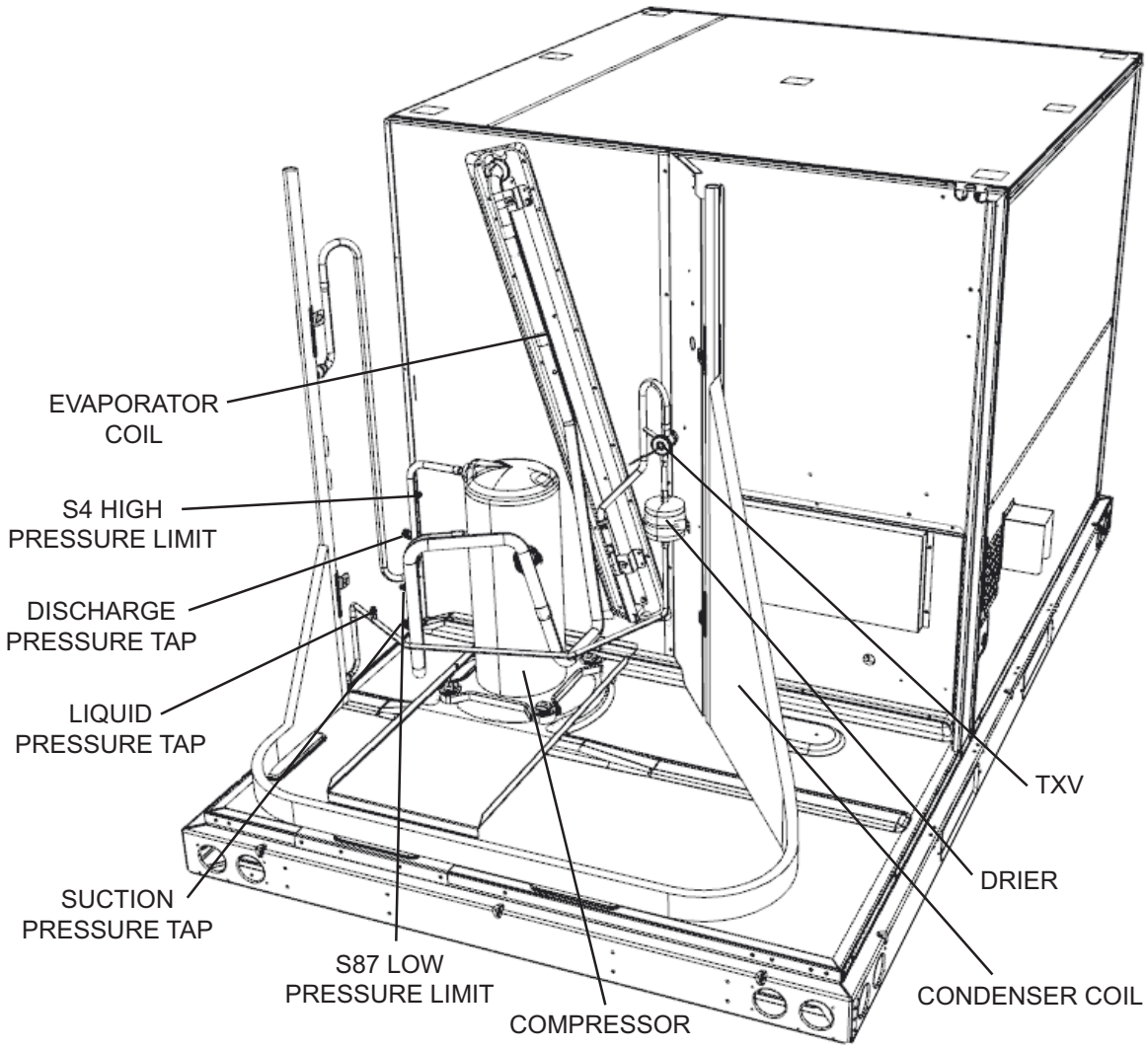


FIGURE 6

B-Cooling Components

All units use independent cooling circuits consisting of separate compressors, condenser coils and evaporator coils. See FIGURE 6. Two draw-through type condenser fans are used in ZCD036-074 units. All units are equipped with belt-drive blowers which draw air across the evaporator during unit operation.

Cooling may be supplemented by a factory- or field installed economizer. The evaporators are row-split. All models use a fixed metering device. The refrigerant circuit always is equipped with a TXV. Each evaporator is also equipped with enhanced fins and rifled tubing.

In all units each compressor is protected by S4 and S7 high pressure switches (on each evaporator). Low ambient switches (S11, S84) are available as an option for additional compressor protection. Each compressor is protected by a crankcase heater.

1-Compressor B1

All units use one scroll compressor. See “SPECIFICATIONS” and “ELECTRICAL DATA” (table of contents) or compressor nameplate for compressor specifications.

⚠ WARNING

Electrical shock hazard. Compressor must be grounded. Do not operate without protective cover over terminals. Disconnect power before removing protective cover. Discharge capacitors before servicing unit. Failure to follow these precautions could cause electrical shock resulting in injury or death.

The compressor is energized by a corresponding compressor contactor.

NOTE-Refer to the wiring diagram section for specific unit operation.

If Interlink compressor replacement is necessary, call 1-800-453-6669.

⚠ IMPORTANT

Some scroll compressors have an internal vacuum protector that will unload scrolls when suction pressure goes below 20 psig. A hissing sound will be heard when the compressor is running unloaded. Protector will reset when low pressure in system rises above 40 psig. DO NOT REPLACE COMPRESSOR.

2-High Pressure Switches S4

The high pressure switch is an auto-reset SPST N.C. switch which opens on a pressure rise. S4 is located in the compressor discharge line and wired in series with the respective compressor contactor coils.

When discharge pressure rises to 640 ± 10 psig (4413 ± 69 kPa) (indicating a problem in the system) the switch opens and the respective compressor is de-energized (the economizer can continue to operate).

3-Low Ambient Switches S11 (field-installed option)

The low ambient switch is an auto-reset SPST N.O. pressure switch which allows for mechanical cooling operation at low outdoor temperatures. The switch is located in the liquid line in the compressor section.

On P and Y volt units, S11 is wired in series with the common (black) lead to K10 outdoor fan motor.

On G and J volt units, S11 is wired in series with outdoor fan relay K10 coil and when opened breaks 24 volts to the coil, de-energizing outdoor fan B4.

When liquid pressure rises to 450 ± 10 psig (3102 ± 69 kPa), the switch closes and the condenser fan is energized. When discharge pressure in drops to 240 ± 10 psig (1655 ± 69 kPa), the switch opens and the condenser fan is de-energized. This intermittent fan operation results in higher evaporating temperature allowing the system to operate without icing the evaporator coil and losing capacity.

4-Compressor Low Discharge Temperature Limit S3 (field-supplied option)

S3 is a thermostat which opens on temperature drop. It is wired in line with the 24VAC compressor contactor.

5-Filter Drier (all units)

Units have a filter drier located in the liquid line of each refrigerant circuit at the exit of each outdoor coil. The drier removes contaminants and moisture from the system.

6-Condenser Fan Motor B4

See specifications section of this manual for specifications of condenser fan B4. All motors are ball bearing type single-phase motors. The fan may be removed for servicing and cleaning by removing the fan grilles.

7-Refrigerant Leak Detection System

This unit is equipped with a Refrigerant Leak Detection System. The system consists of the RDS Non-Communicating Blower Control Board (RDSC) in the control compartment and a R454B Refrigerant Sensor near the coil. The Modes of Operation for the RDS Non-Communicating Blower Control Board are Initializing, Normal, Leak Detected, and Fault.

MODES OF OPERATION

Initializing

The RDS Non-Communicating Blower Control Board is establishing connection with the refrigerant detection sensor and sensor is “warming up”.

Normal

The HVAC system is functioning normally, i.e., responding to thermostat demand signals. The RDS Non-Communicating Blower Control Board has not detected a refrigerant leak.

Leak Detected (Mitigation)

When the RDS Non-Communicating Blower Control Board detects a refrigerant leak:

1 - The RDS Non-Communicating Blower Control Board shuts off the (R) output (24VAC power) to the thermostat, which de-energizes the outdoor unit compressor and heat sources, such as gas and/or electric strip heat. No heating or cooling demands will be met.

2 - The RDS Non-Communicating Blower Control Board activates the blower ventilation speed (G). The blower purges refrigerant from the cabinet, plenum, and ductwork.

3 - After the RDS Non-Communicating Blower Control Board determines the refrigerant levels are below the safety threshold, the blower will continue to function for an additional seven (7) minutes.

4 - After the blower sequence is complete, the HVAC system resumes normal operation.

NOTE - *The HVAC system may not maintain a cooling or heating setpoint if a significant leak exists. Any refrigerant leaks that remain unaddressed for an extended time may cause the HVAC system to shut down on a low refrigerant pressure limit condition.*

Fault/Service

When a fault is detected within the RDS Non-Communicating Blower Control Board, the indoor blower engages and remains engaged at a constant output until the fault is cleared.

DIAGNOSTIC CODES / TROUBLESHOOTING

The RDS Non-Communicating Blower Control Board is equipped with a multicolor LED. The LED signals the operational state of the RDS Non-Communicating Blower Control Board. To review the operational states, refer to TABLE 2, LED Operational Modes / Troubleshooting, for details.

Red diagnostic codes indicate a specific RDS Non-Communicating Blower Control Board issue. To determine the issue and possible troubleshooting actions, refer to TABLE 3, Red LED Diagnostic Codes / Troubleshooting.

The RDS Non-Communicating Blower Control Board is equipped with a Test/Reset button. The Test button can be used to complete several functions, depending on the mode of operation of the RDS Non-Communicating Blower Control Board. TABLE 4 lists the functions of the Test button during each mode of operation.

TABLE 2

LED Operational Modes / Troubleshooting

Operating Mode	LED Status	Action
Initializing	Flashing green	None
Monitoring	Solid green*	None
Mitigation (Leak Detected)	Flashing blue	Check coil tubes for leak. Repair the issue and restart the equipment.
Fault / Service	Solid blue, interrupted by red flash code	Refer to table for troubleshooting guidance.

*Solid green interrupted by a blue flash indicates the mitigation process has previously occurred.

TABLE 3

Red LED Diagnostic Codes / Troubleshooting

Red Wink	Applies to Individual Sensor(s)	Issue	Action
1	Yes	RDS Sensor Fault	Replace sensor
2	No	Drain pan overflow	Check board for alarms, remedy alarms present. If float switch is installed, verify proper switch mounting location, depth in pan, unobstructed condensate drain line; correct as needed.
3	Yes	Incompatible sensor installed	Replace sensor
4	Yes	Sensor communication issue	Check sensor connection. Ensure connection is clean and tight
5	No	R-input not available	Check for 24VAC power connected to thermostat R terminal on the RDSC. 24VAC power should only be provided at A194-R quick connection for the RDSC to function.
6	No	Invalid configuration of sensor count	Not applicable

TABLE 4

Test Button Functions

Operation Mode	Press the Test button to...	Press	Action
Monitoring	Trigger a leak detection response. Verify all equipment is wired correctly into the RDSC (after installation).	Short	Clear purge-counter if prior mitigation has occured; test mitigation.
		Long	Reset control.
Mitigating (Leak Detected)	Reset the RDSC to a normal mode of operation after a previous leak has been detected and purged from the HVAC system.	Short	If testing mitigation, end test.
Fault/Service	Reset the RDSC after troubleshooting and resolving a fault condition. If the fault is not resolved, the RDSC will enter the Fault mode again.	Short	Reevaluate fault condition - if cleared, return to monitoring, otherwise update indicator.
		Long	Reset control.

RDS SENSORS

Units are equipped with factory-installed RDS Sensors located on different points on the unit. The RDS sensors provide the Unit Controller with continuous readings for leaked refrigerant concentration levels and sensor health status (Good or Fault). These readings are used to modify unit operation to disperse the leaked refrigerant and to remove possible ignition sources. In addition, the Unit Controller uses these readings to initiate alarms to alert the operator of a refrigerant leak or faulty sensor(s).

Each sensor must be specifically placed for proper unit operation and to initiate valid alarms. To identify sensor locations see TABLE 5.

TABLE 5

RDS Sensor Figures

Model	Qty.	Type	Figure
ZCD036-074	1 sensor	INDOOR SENSOR	FIGURE 5

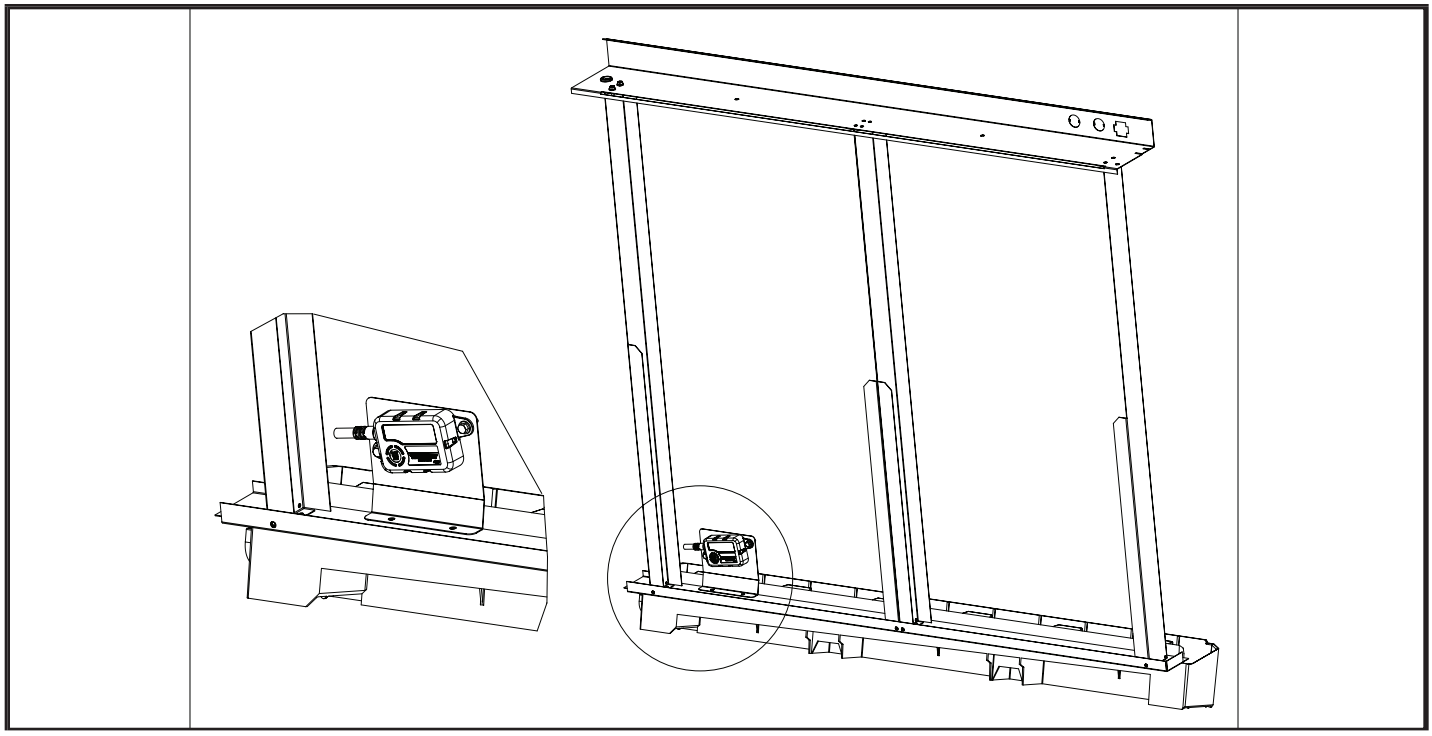


FIGURE 7

SENSOR MAINTENANCE

It is recommended to check the state of the sensor every 6 months, at the beginning of each cooling and heating season.

- Check that the sensor cable is in good condition.
- Ensure that the sensor opening is clear and free of debris.
  - DO NOT use abrasive cleaning solutions or detergents to clean sensor opening.
  - DO NOT use flammable compressed air solutions to clean the sensor opening.
  - DO NOT vacuum sensor inlet opening, as this could cause damage to the sensor internal components.
- Replace sensor if the opening is not clean or free of debris.

NOTE - *When cleaning the evaporator coil, remove the sensor from the coil. Recommended method is removal of bracket with sensor attached.*

See FIGURE 8 for an example of a clear, unobstructed sensor inlet.

FIGURE 8

C-Blower Compartment

Units are equipped with one of two factory-installed blower options. The ninth character in the model number identifies the blower as follows:

B= Units are equipped with a single-stage belt drive blower.

T= ZCD074S5T units are equipped with two-stage blowers. The blower will operate at high speed with a Y2 thermostat demand and low speed with a Y1 thermostat demand. Low speed operation delivers approximately ⅔ of the air volume of high speed. Two-speed blower operation results in lower energy consumption.

trical FLA and LRA specifications will vary. See unit rating plate for information specific to your unit.

⚠ IMPORTANT

Three phase scroll compressors must be phased sequentially for correct compressor and blower rotation. Follow "COOLING START-UP" section of installation instructions to ensure proper compressor and blower operation.

1-Blower Operation

Initiate blower demand at thermostat according to instructions provided with thermostat. Unit will cycle on thermostat demand. The following steps apply to applications using a typical electro-mechanical thermostat.

1 - Blower operation is manually set at the thermostat subbase fan switch. With fan switch in **ON** position, blowers will operate continuously.

2 - With fan switch in **AUTO** position, the blowers will cycle with demand. Blowers and entire unit will be off when system switch is in **OFF** position.

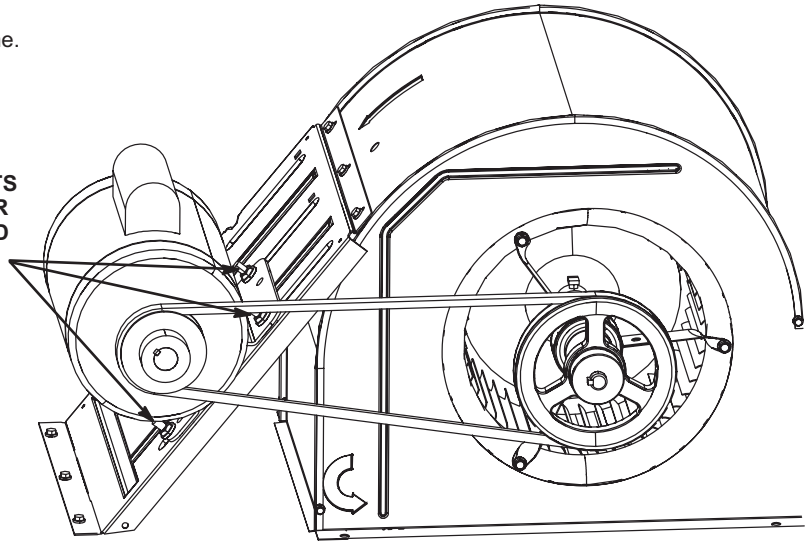
BLOWER ASSEMBLY

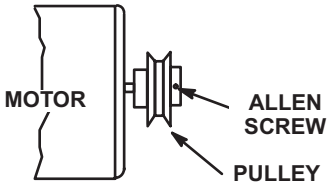
TO INCREASE BELT TENSION

1-Loosen four bolts securing motor base to mounting frame.

2-Slide the motor downward to tighten the belt.

3-Tighten four bolts on motor base.





TO INCREASE CFM
LOOSEN ALLEN SCREW & TURN PULLEY CLOCKWISE

TO DECREASE CFM
TURN PULLEY COUNTERCLOCKWISE

FIGURE 9

2-Determining Unit CFM - Belt Drive Blowers

IMPORTANT - ZCD074S5T blower (G thermostat) ***CFM MUST BE ADJUSTED IN HIGH SPEED***. See TABLE 6.

TABLE 6
TWO-SPEED BLOWER OPERATION
ZGD/ZCD074ST UNITS

Thermostat	Blower Speed
G	Low
W1	High
W2	High
Y1	Low
Y2	High

**Factory-installed jack/plug connection.*

1 - The following measurements must be made with air filters in place.

2 - With all access panels in place, measure static pressure external to unit (from supply to return). Blower performance data is based on static pressure readings taken in locations shown in FIGURE 10.

NOTE - *Static pressure readings can vary if not taken where shown.*

Referring to the blower tables starting on page 7 use static pressure and RPM readings to determine unit CFM. Use air resistance table when installing units with any of the options or accessories listed.

3 - The blower RPM can be adjusted at the motor pulley. Loosen Allen screw and turn adjustable pulley clockwise to increase CFM. Turn counterclockwise to decrease CFM. See FIGURE 9. Do not exceed minimum and maximum number of pulley turns as shown in TABLE 7.

TABLE 7
MINIMUM AND MAXIMUM PULLEY ADJUSTMENT

Belt	Min. Turns Open	Max. Turn Open
A Section	No minimum	5

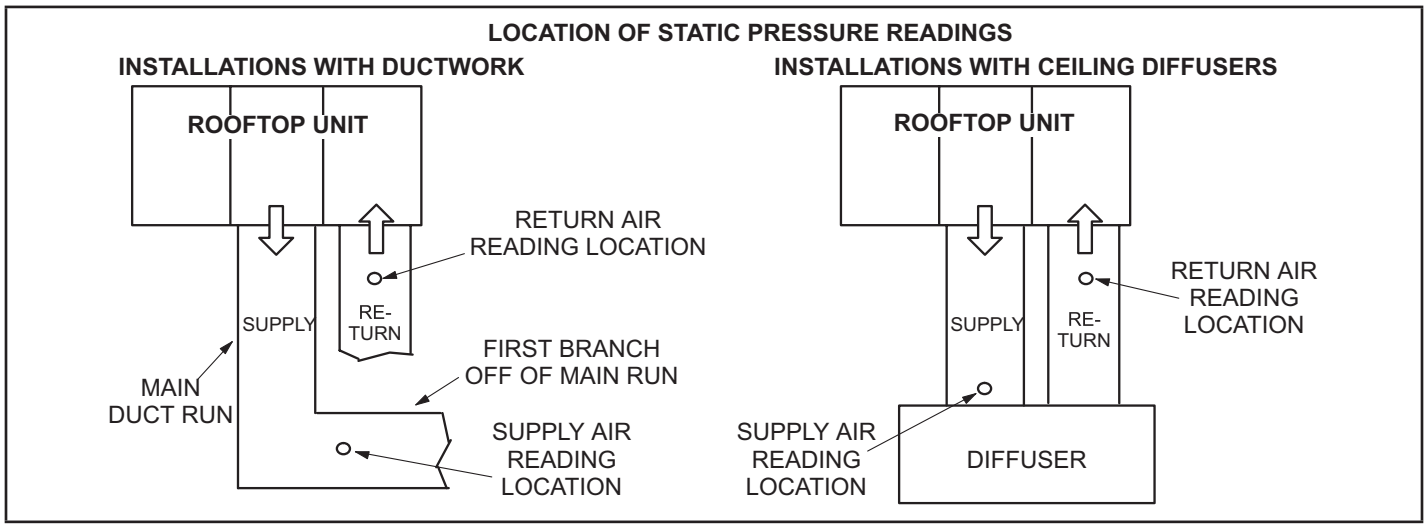


FIGURE 10

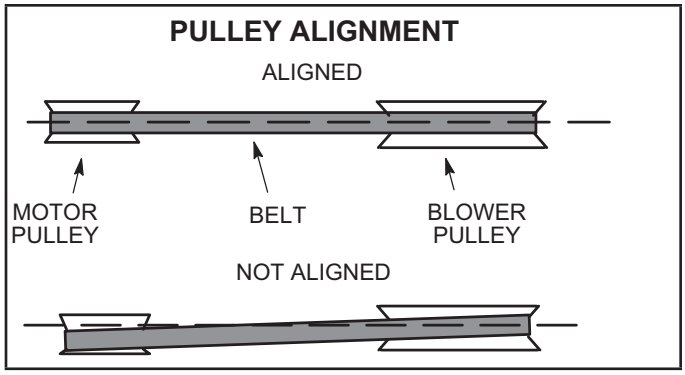


FIGURE 11

3-Blower Belt Adjustment

Maximum life and wear can be obtained from belts only if proper pulley alignment and belt tension are maintained. Tension new belts after a 24-48 hour period of operation. This will allow belt to stretch and seat into grooves. Make sure blower and motor pulley are aligned as shown in FIGURE 11.

1 - Loosen four bolts securing motor base to mounting frame. See FIGURE 9.

2 - To increase belt tension

Slide blower motor downward to tighten the belt. This increases the distance between the blower motor and the blower housing.

3 - To loosen belt tension

Slide blower motor upward to loosen the belt. This decreases the distance between the blower motor and the blower housing.

4 - Tighten four bolts securing motor base to the mounting frame.

4-Check Belt Tension

Overtensioning belts shortens belt and bearing life. Check belt tension as follows:

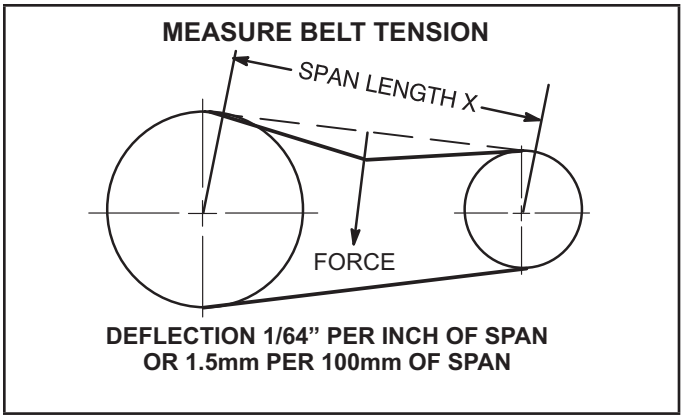


FIGURE 12

1 - Measure span length X. See FIGURE 12.

2 - Apply perpendicular force to center of span (X) with enough pressure to deflect belt 1/64" for every inch of span length or 1.5mm per 100mm of span length. Example: Deflection distance of a 40" span would be 40/64" or 5/8".

Example: Deflection distance of a 400mm span would be 6mm.

3 - Measure belt deflection force. For a used belt, the deflection force should be 5 lbs. (35kPa). A new belt deflection force should be 7 lbs. (48kPa).

A force below these values indicates an undertensioned belt. A force above these values indicates an overtensioned belt.

5-Field-Furnished Blower Drives

For field-furnished blower drives, use belt drive blower tables to determine BHP and RPM required. Reference page 12 for additional air resistance and page 11 to determine the drive kit number. See TABLE 8 for drive component manufacturers numbers.

TABLE 8
DRIVE COMPONENT MANUFACTURER'S NUMBERS

Drive No.	DRIVE COMPONENT PART NUMBERS					
	Motor Pulley		Blower Pulley		Belts	
	Browning	OEM	Browning	OEM	Browning	OEM
Z01	1VP34 X 7/8	31K6901	AK54 X 5/8	10024430	A40	10024517
Z02	1VP34 X 7/8	31K6901	AK46 X 5/8	10024431	A39	10024516
Z03	1VP34 X 7/8	31K6901	AK41 X 5/8	10024428	A39	10024516
Z04	1VP34 X 7/8	31K6901	AK39 X 5/8	10024432	A38	10024515
Z05	1VP44 X 7/8	P81488	AK49 X 5/8	10024426	A41	10024518
ZAA01	1VP34 X 7/8	31K69	AK69 X 1	37L47	AX51	13H01
ZAA02	1VP40 X 7/8	79J03	BK80H	100788-03	A53	100245-40
ZAA03	1VP40 X 7/8	79J03	AK59 X 1	31K68	A50	100245-29
ZAA04	1VP44 X 7/8	P81488	AK59 X 1	31K68	AX51	13H01

D-Optional Electric Heat Components

TABLE 9 shows electric heat fuse ratings. See Options/ Accessories section (see table of contents) for ZCD to EHA match-ups. See Electrical/Electric Heat Data section (see table of contents) of this manual for electrical ratings and capacities.

All electric heat sections consist of electric heating elements exposed directly to the air stream. See FIGURE 15.

EHA parts arrangement is shown in FIGURE 14 and FIGURE 15. Multiple-stage elements are sequenced on and off in response to thermostat demand.

1-Contactors K15, K16

Contactors K15 and K16 are three-pole double-break contactors located on the electric heat vestibule. All contactors are equipped with a 24VAC coil. The coils in the K15 and K16 contactors are energized by a W2 thermostat demand and K9. Contactor K15 energizes the first stage heating elements, while K16 energizes the second stage heating elements.

2-High Temperature Limits S15 (Primary)

S15 is a SPST normally closed auto-reset thermostat located on the back panel of the electric heat section below the heating elements. S15 is the high temperature limit for the electric heat section. When S15 opens, indicating a problem in the system, contactor K15 is de-energized.

When K15 is de-energized, first stage and all subsequent stages of heat are de-energized. For EHA102/150 units, the electric heat section thermostat is factory set to open at 170ºF ± 5ºF (76ºC ± 2.8ºC) on a temperature rise and automatically reset at 130ºF ± 6ºF (54.4ºC ± 3.3ºC) on a temperature fall. For EHA100 units, the electric heat section thermostat is factory set to open at 160ºF ± 5ºF (71.0ºC ± 2.8ºC) on a temperature rise and automatically reset at 120ºF ± 6F (49.0C ± 3.3ºC) on a temperature fall. The thermostat is not adjustable.

3-High Temperature Limit S20, S157, S158, S15, S160 & S161 (Secondary)

Limits are SPST normally closed manual-reset thermostat Like the primary temperature limit, S20 is wired in series with the first stage contactor coil (K15) and second stage contactor coil (K16). When S20 opens, contactors K15, K16) are de-energized. When the contactors are de-energized, first stage and all subsequent stages of heat are de-energized. The thermostat is factory set to open at 220ºF ± 6ºF (104ºC ± 3.3ºC) on a temperature rise and can be manually reset when temperature falls below 160ºF (71.0ºC).

4-Terminal Block TB2

Terminal block TB2 is used for single point power installations only. TB2 distributes L1, L2 and L3 power to TB3. Units with multi-point power connections will not use TB2.

5-Terminal Block TB3

Electric heat line voltage connections are made to terminal block TB3 located in the upper left corner of the electric heat vestibule. TB3 distributes power to the electric heat components.

6-Heating Elements HE1 through HE6

Heating elements are composed of helix wound bare nichrome wire exposed directly to the air stream. Three elements are connected in a three-phase arrangement. The elements in 208/230V units are connected in a “Delta” arrangement. Elements in 460 and 575V units are connected in “Wye” arrangement. Each stage is energized independently by the corresponding contactors located on the electric heat vestibule panel. Once energized, heat transfer is instantaneous. High temperature protection is provided by primary and redundant high temperature limits and overcurrent protection is provided by fuses.

7-Fuse F3

Fuse F3, is housed in a fuse block which holds three fuses. Each fuse is connected in series with each leg of electric heat. FIGURE 14 and TABLE 9 show the fuses used with each electric heat section. For simplicity, the service manual labels the fuses F3 - 1, 2 and F4 - 1, 2.

8-Unit Fuse Block F4

Three line voltage fuses F4 provide short circuit and ground fault protection to all cooling components in the ZCD units with electric heat. The fuses are rated in accordance with the amperage of the cooling components.

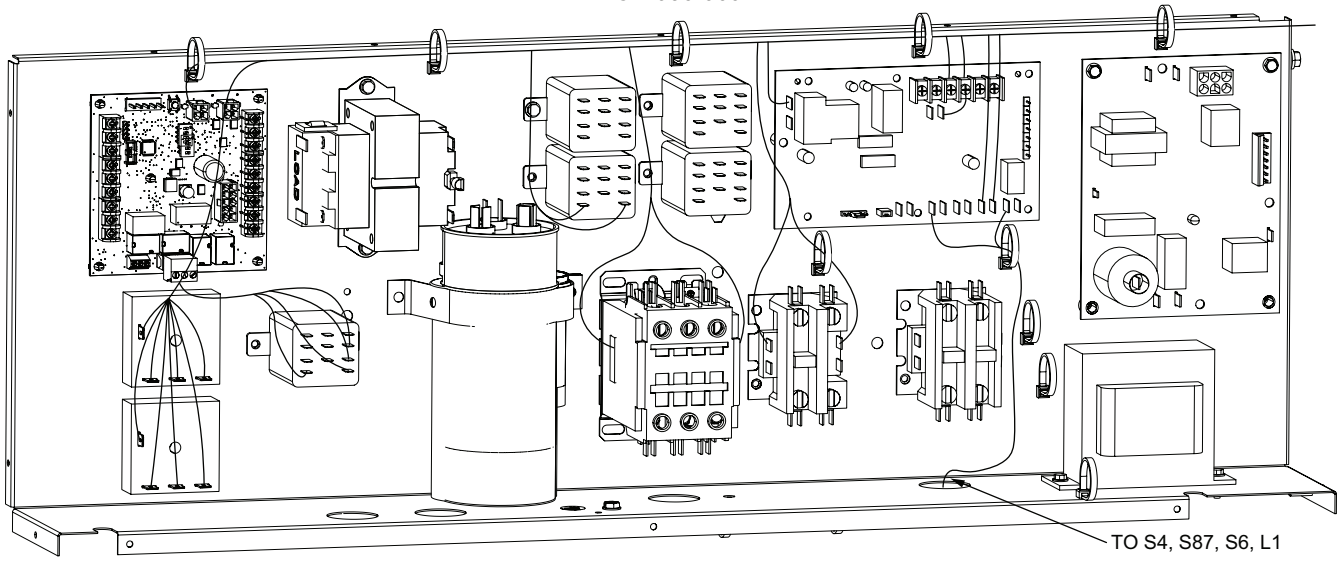
ELECTRIC HEAT CONTROL ASSEMBLY

1-Electric Heat Relay K9

All ZCD series units with electric heat use an electric heat relay K9. K9 is a N.O. DPDT pilot relay intended to electrically isolate the unit’s 24V circuit from the electric heat 24V circuit. K9 is energized by the thermostat TB1-W1 AND TB1-W2 signals on ZCD and by CMC1 Defrost control and TB1 on ZCD units. The J2/P2 connection can be found in the heating compartment. See FIGURE 14 for location of the K9 relay on the electric heat vest-panel.

SINGLE DISCONNECT INSTALLATIONS

ZCD 036-060



ZCD 074

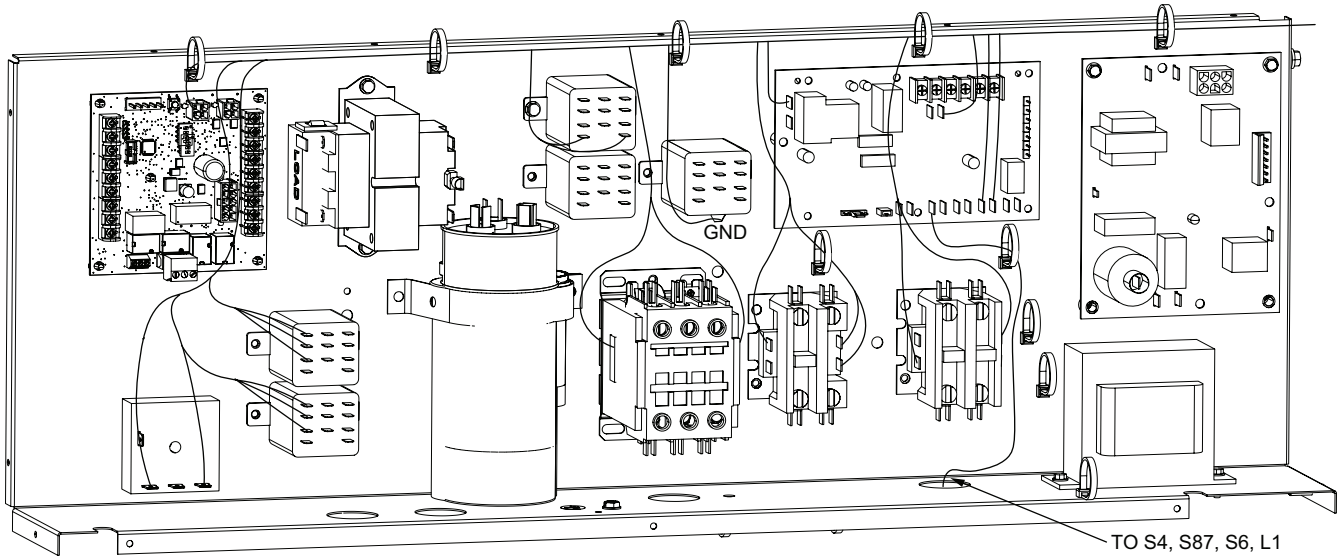


FIGURE 13

ELECTRIC HEAT VESTIBULE PARTS ARRANGEMENT

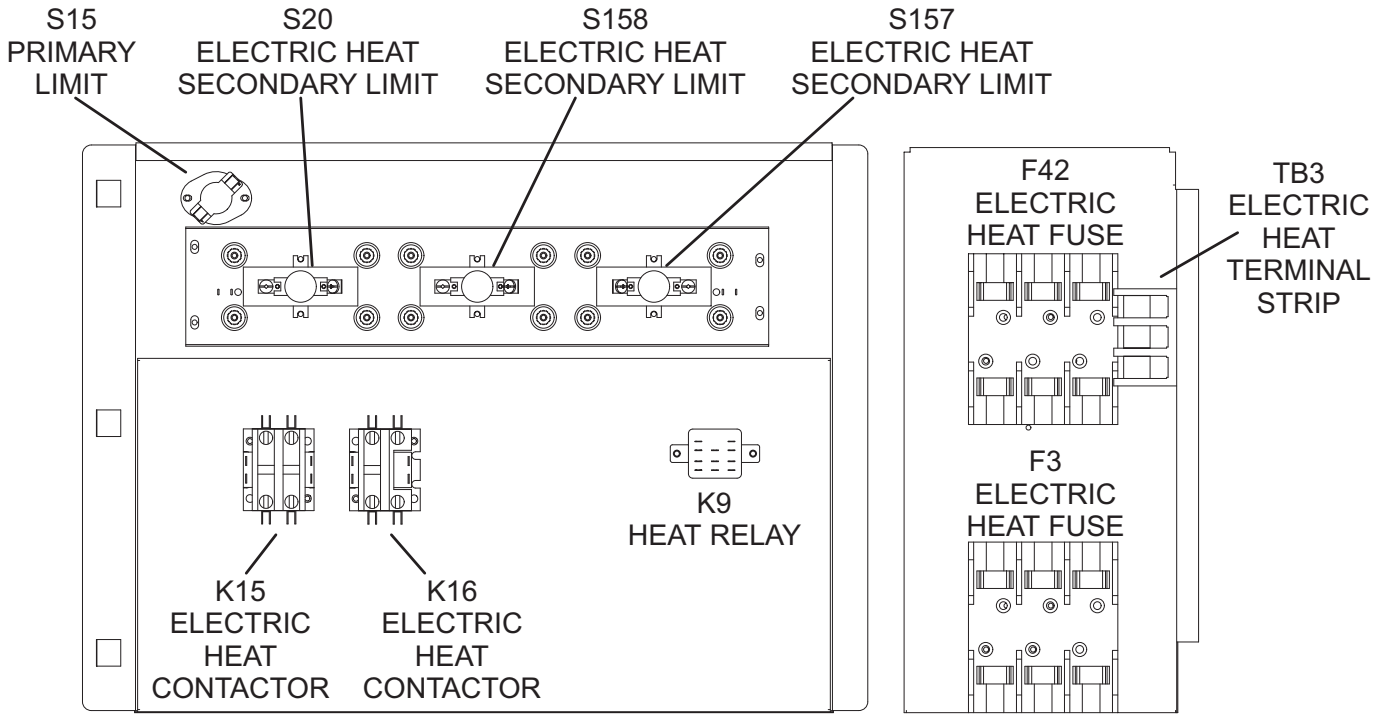


FIGURE 14

ZCD036-074 ELECTRIC HEAT PARTS ARRANGEMENT
5.0, 7.5, 10, 15, 22.5, 30 kw

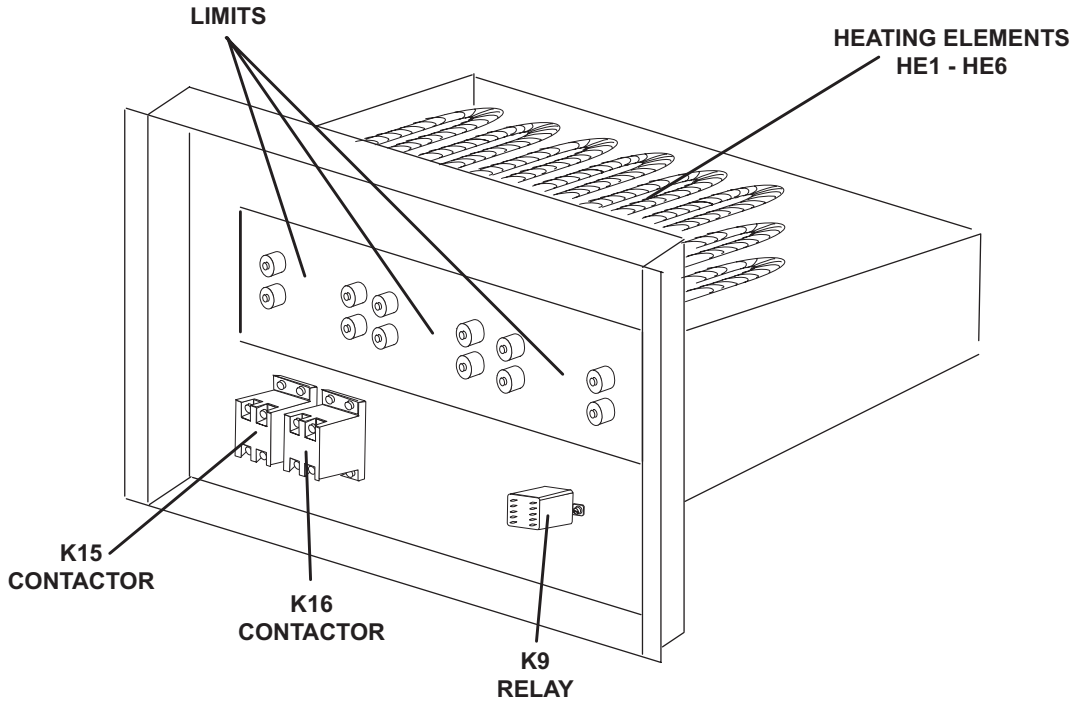


FIGURE 15

TABLE 9

kW	Voltage	Fuse F3	Qty
5.0	P	30A - 250V	2
7.5	P	40A - 250V	2
10*	P	35A - 250V	2
15	P	40A - 250V	4
22.5	P	40A - 250V	6
5.0	Y	20A - 250V	3
7.5	Y	25A - 250V	3
10	Y	35A - 250V	3
15	Y	50A - 250V	3
22.5	Y	40A - 250V	6
5.0	G	15A - 600V	3
7.5	G	15A - 600V	3
10	G	20A - 600V	3
15	G	25A - 600V	3
22.5	G	35A - 600V	3
5.0	J	15A - 600V	3
7.5	J	15A - 600V	3
10	J	15A - 600V	3
15	J	20A - 600V	3
22.5	J	30A - 600V	3

II-PLACEMENT AND INSTALLATION

Make sure the unit is installed in accordance with the installation instructions and all applicable codes. See accessories section for conditions requiring use of the optional roof mounting frame (Z1CURB40B-1, Z1CURB41B-1, Z1CURB42B-1, or Z1CURB43B-1).

III-STARTUP - OPERATION

A-Preliminary and Seasonal Checks

1 - Make sure the unit is installed in accordance with the installation instructions and applicable codes.

2 - Inspect all electrical wiring, both field and factory installed for loose connections. Tighten as required. Refer to unit diagram located on inside of unit compressor access panel.

3 - Check to ensure that refrigerant lines are in good condition and do not rub against the cabinet or other refrigerant lines.

4 - Check voltage at the disconnect switch. Voltage must be within the range listed on the nameplate. If not, consult the power company and have the voltage corrected before starting the unit.

5 - Recheck voltage and amp draw with unit running. If voltage is not within range listed on unit nameplate, stop unit and consult power company. Refer to unit nameplate for maximum rated load amps.

6 - Inspect and adjust blower belt (see section on Blower Compartment - Blower Belt Adjustment).

B-Cooling Startup

Operation

1 - Initiate first and second stage cooling demands according to instructions provided with thermostat.

2 - *No Economizer Installed in Unit* -

A first-stage cooling demand (Y1) will energize compressor 1 and both condenser fans. An increased cooling demand (Y2) will not change operation.

Units Equipped With Economizer -

When outdoor air is acceptable, a first-stage cooling demand (Y1) will energize the economizer. An increased cooling demand (Y2) will energize compressor 1 and the condenser fan. When outdoor air is not acceptable unit will operate as though no economizer is installed.

3 - Units contain one refrigerant circuits or stage.

4 - Unit is charged with R-454B refrigerant. See unit rating plate for correct amount of charge.

5 - Refer to section IV CHARGING for proper method to check refrigerant charge.

C-Safety or Emergency Shutdown

Turn off power to unit. Close manual and main gas valves.

Three Phase Scroll Compressor Voltage Phasing

Three phase power supplied to the unit disconnect switch must be phased sequentially to ensure the scroll compressor and indoor blower rotate in the correct direction. Compressor and blower are wired in phase at the factory. Power wires are color-coded as follows: line 1-red, line 2-yellow, line 3-blue.

1 - Observe suction and discharge pressures and blower rotation on unit start-up.

2 - Suction pressure must drop, discharge pressure must rise and blower rotation must match rotation marking. If pressure differential is not observed or blower rotation is not correct:

3 - Disconnect all remote electrical power supplies.

4 - Reverse any two field-installed wires connected to the line side of K2 contactor or disconnect switch if installed. Do not reverse wires at blower contactor.

5 - Make sure the connections are tight. Discharge and suction pressures should operate at their normal start-up ranges.

IV-CHARGING

⚠ WARNING

Refrigerant can be harmful if it is inhaled. Refrigerant must be used and recovered responsibly.

Failure to follow this warning may result in personal injury or death.

REFRIGERANT CHARGE AND CHECK

A-Refrigerant Charge and Check

WARNING-Do not exceed nameplate charge under any condition.

This unit is factory charged and should require no further adjustment. If the system requires additional refrigerant, reclaim the charge, evacuate the system, and add required nameplate charge.

Refrigerant Charge R-454B		
Unit	M_c(lbs)	M_c(kg)
ZCD 036	4.10	1.86
ZCD 048	4.25	1.93
ZCD 060	4.63	2.10
ZCD 074	5.00	2.27

When breaking into the refrigerant circuit to make repairs – or for any other purpose – conventional procedures shall be used. However, for flammable refrigerants it is important that best practice be followed and, since flammability is a consideration, the following procedure shall be adhered to:

- Safely remove refrigerant following local and national regulations,
- Evacuate the circuit,
- Purge the circuit with inert gas,
- Evacuate,
- Purge with inert gas,
- Open the circuit

The refrigerant charge shall be recovered into the correct recovery cylinders if venting is not allowed by local and national codes. For appliances containing flammable refrigerants, the system shall be purged with oxygen-free nitrogen to render the appliance safe for flammable refrigerants. This process might need to be repeated several times. Compressed air or oxygen shall not be used for purging refrigerant systems. Refrigerant purging shall be achieved by breaking the vacuum in the system with oxygen-free nitrogen and continuing to fill until the working pressure is achieved, then venting to atmosphere, and finally pulling down to a vacuum. This process shall be repeated until no refrigerant is within the system. When the final oxygen-free nitrogen charge is used, the system shall be vented down to atmospheric pressure to enable work to take place. Ensure that the outlet for the vacuum pump is not close to any potential ignition sources and that ventilation is available.

In addition to conventional charging procedures, the following requirements shall be followed.

- Ensure that contamination of different refrigerants does not occur when using charging equipment. Hoses or lines shall be as short as possible to minimize the amount of refrigerant contained in them.
- Cylinders shall be kept in an appropriate position according to the instructions.
- Ensure that the refrigerating unit is earthed prior to charging the system with refrigerant.
    - Label the system when charging is complete (if not already).
    - Extreme care shall be taken not to overfill the refrigerating unit.

Prior to recharging the system, it shall be pressure-tested with the appropriate purging gas. The system shall be leak-tested on completion of charging but prior to commissioning. A follow up leak test shall be carried out prior to leaving the site.

- When removing refrigerant from a system, either for servicing or decommissioning, it is recommended good practice that all refrigerants are removed safely. When transferring refrigerant into cylinders, ensure that only appropriate refrigerant recovery cylinders are employed. Ensure that the correct number of cylinders for holding the total system charge is available. All cylinders to be used are designated for the recovered refrigerant and labelled for that refrigerant (i. e. special cylinders for the recovery of refrigerant). Cylinders shall be complete with pressure- relief valve and associated shut-off valves in good working order. Empty recovery cylinders are evacuated and, if possible, cooled before recovery occurs.
- The recovery equipment shall be in good working order with a set of instructions concerning the equipment that is at hand and shall be suitable for the recovery of all appropriate refrigerants includ-ing, when applicable, flammable refrigerants. In ad-dition, a set of calibrated weighing scales shall be available and in good working order. Hoses shall be complete with leak-free disconnect couplings and in good condition. Before using the recovery machine, check that it is in satisfactory working order, has been properly maintained and that any associated electrical components are sealed to prevent ignition in the event of a refrigerant release. Consult manu-facturer if in doubt.
- The recovered refrigerant shall be returned to the refrigerant supplier in the correct recovery cylinder, and the relevant waste transfer note arranged. Do not mix refrigerants in recovery units and especially not in cylinders.

- If compressors or compressor oils are to be removed, ensure that they have been evacuated to an acceptable level to make certain that flammable refrigerant does not remain within the lubricant. The evacuation process shall be carried out prior to returning the compressor to the suppliers. Only electric heating to the compressor body shall be employed to accelerate this process. When oil is drained from a system, it shall be carried out safely.

NOTE - *System charging is not recommended below 60F (15C). In temperatures below 60F (15C), the charge must be weighed into the system.*

If weighing facilities are not available, or to check the charge, use the following procedure:

IMPORTANT - Charge unit in standard cooling mode.

1 - Make sure outdoor coil is clean. Attach gauge manifolds and operate unit at full CFM in cooling mode with economizer disabled until system stabilizes (approximately five minutes). Make sure all outdoor air dampers are closed. operate the unit in cooling mode at high speed using the following mobile service app menu path:

RTU MENU > COMPONENT TEST > COOLING > COOLING STAGE 3

2 - Compare the normal operating pressures to the pressures obtained from the gauges. Check unit components if there are significant differences.

3 - Measure the outdoor ambient temperature and the suction pressure. Refer to the charging curve to determine a target liquid temperature.

Note - *Pressures are listed for sea level applications.*

4 - Use the same thermometer to accurately measure the liquid temperature (in the outdoor section).

- If measured liquid temperature is higher than the target liquid temperature, add refrigerant to the system.
- If measured liquid temperature is lower than the target liquid temperature, recover some refrigerant from the system.

5 - Add or remove charge in increments. Allow the system to stabilize each time refrigerant is added or removed.

6 - Continue the process until measured liquid temperature agrees with the target liquid temperature. Do not go below the target liquid temperature when adjusting charge. Note that suction pressure can change as charge is adjusted.

7 - Example: For ZCD036, at 95°F outdoor ambient and a measured suction pressure of 130psig, the target liquid temperature is 100°F. For a measured liquid temperature of 106°F, add charge in increments until measured liquidtemperature agrees with the target liquid temperature.

TABLE 10
ZCD036 NORMAL OPERATING PRESSURES - ALL-ALUMINUM COIL

Outdoor Coil Entering Air Temperature											
65°F		75°F		85°F		95°F		105°F		115°F	
Suct (psig)	Disc (psig)	Suct (psig)	Disc (psig)	Suct (psig)	Disc (psig)	Suct (psig)	Disc (psig)	Suct (psig)	Disc (psig)	Suct (psig)	Disc (psig)
102	213	103	249	106	289	110	334	115	382	122	435
114	216	115	252	118	293	121	337	127	386	134	439
134	221	135	258	137	299	141	345	146	394	153	448
150	227	151	265	153	306	156	353	162	403	168	457

TABLE 11
ZCD048 NORMAL OPERATING PRESSURES - ALL-ALUMINUM COIL

Outdoor Coil Entering Air Temperature											
65°F		75°F		85°F		95°F		105°F		115°F	
Suct (psig)	Disc (psig)	Suct (psig)	Disc (psig)	Suct (psig)	Disc (psig)	Suct (psig)	Disc (psig)	Suct (psig)	Disc (psig)	Suct (psig)	Disc (psig)
104	228	107	266	110	307	113	353	117	402	120	455
110	230	114	268	118	310	122	357	126	407	131	461
121	234	127	274	132	318	138	365	144	417	150	472
130	239	137	280	144	325	151	375	159	428	166	485

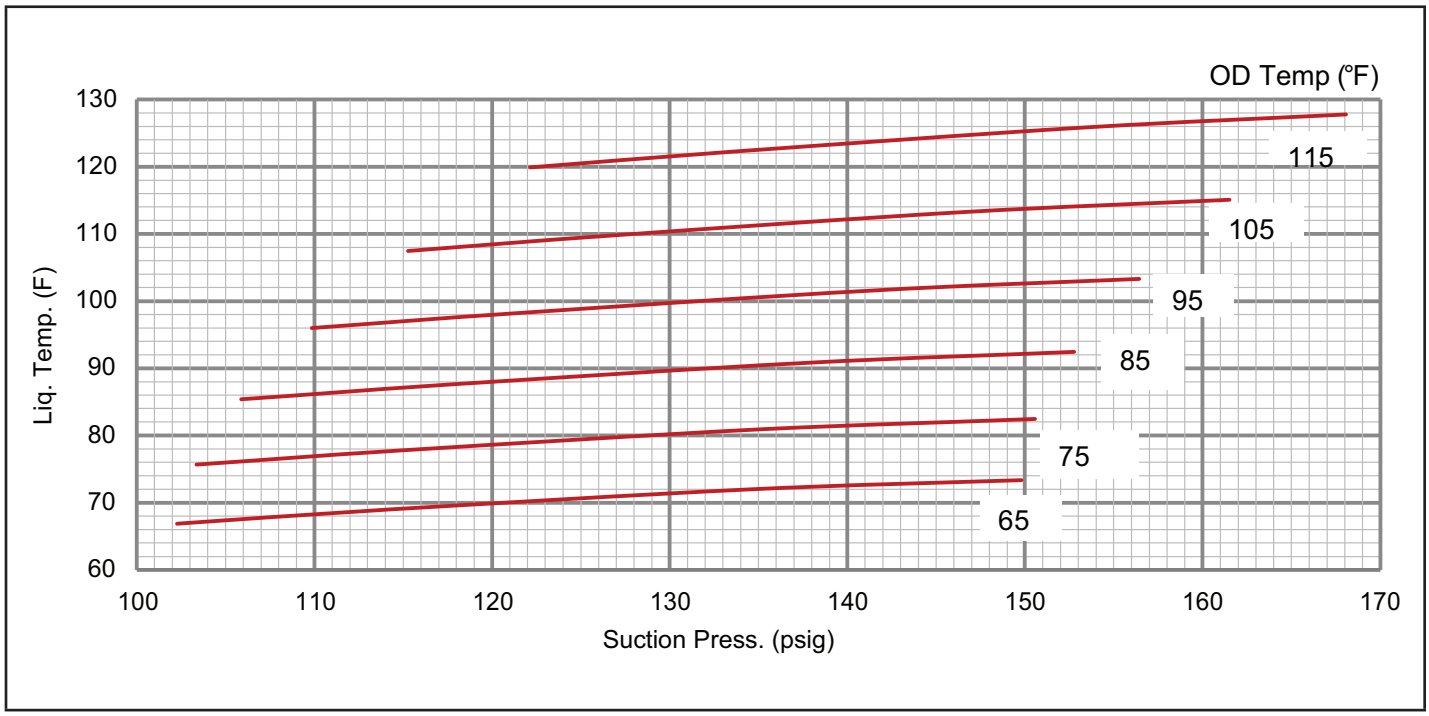
TABLE 12
ZCD060 NORMAL OPERATING PRESSURES - ALL-ALUMINUM COIL

Outdoor Coil Entering Air Temperature											
65°F		75°F		85°F		95°F		105°F		115°F	
Suct (psig)	Disc (psig)	Suct (psig)	Disc (psig)	Suct (psig)	Disc (psig)	Suct (psig)	Disc (psig)	Suct (psig)	Disc (psig)	Suct (psig)	Disc (psig)
101	235	102	272	104	314	105	360	106	411	107	466
108	241	111	279	113	321	115	368	116	419	118	475
123	250	127	289	130	332	133	380	136	433	138	490
138	255	142	295	146	340	151	389	154	443	158	501

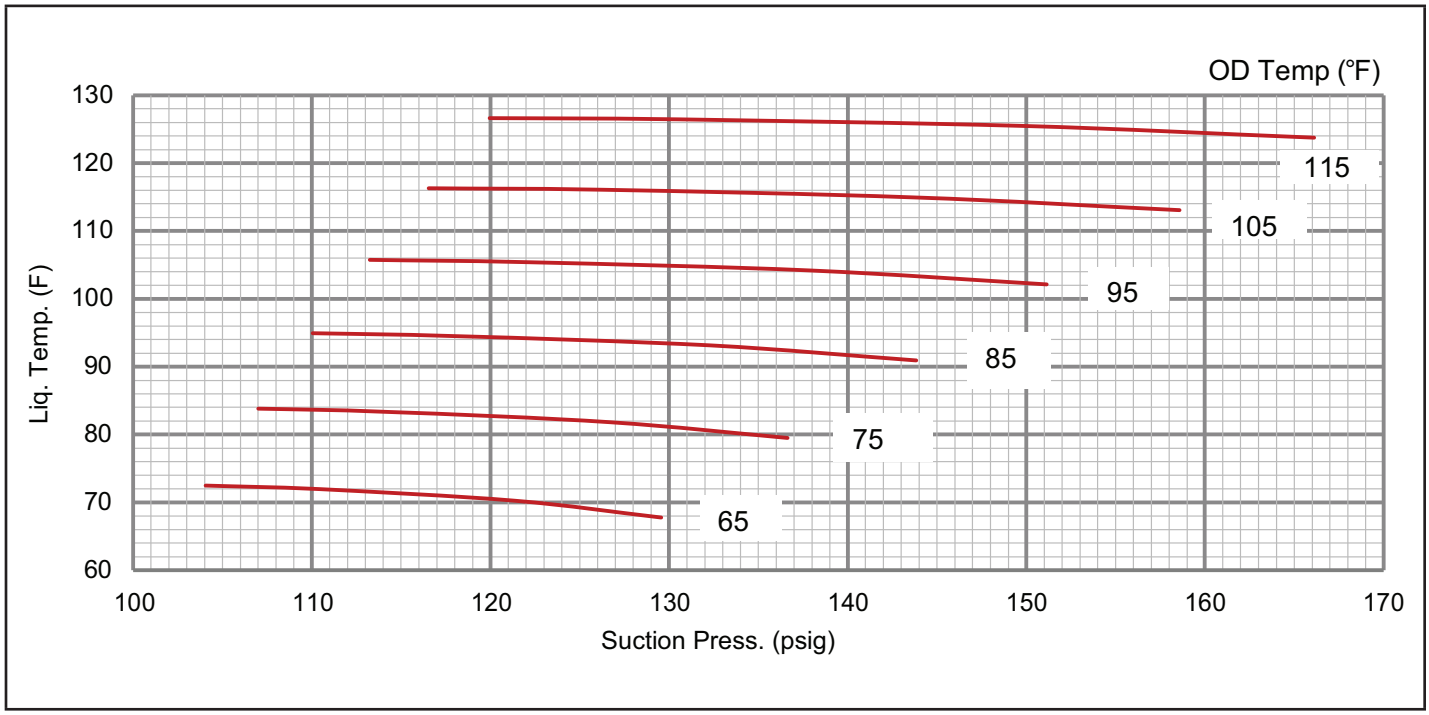
TABLE 13
ZCD074 NORMAL OPERATING PRESSURES - ALL-ALUMINUM COIL

Outdoor Coil Entering Air Temperature											
65°F		75°F		85°F		95°F		105°F		115°F	
Suct (psig)	Disc (psig)	Suct (psig)	Disc (psig)	Suct (psig)	Disc (psig)	Suct (psig)	Disc (psig)	Suct (psig)	Disc (psig)	Suct (psig)	Disc (psig)
102	241	104	279	106	323	108	373	109	428	110	489
109	244	111	283	114	327	116	377	118	433	120	495
123	251	127	291	131	336	134	388	137	445	140	508
138	261	143	302	148	348	153	401	157	459	160	523

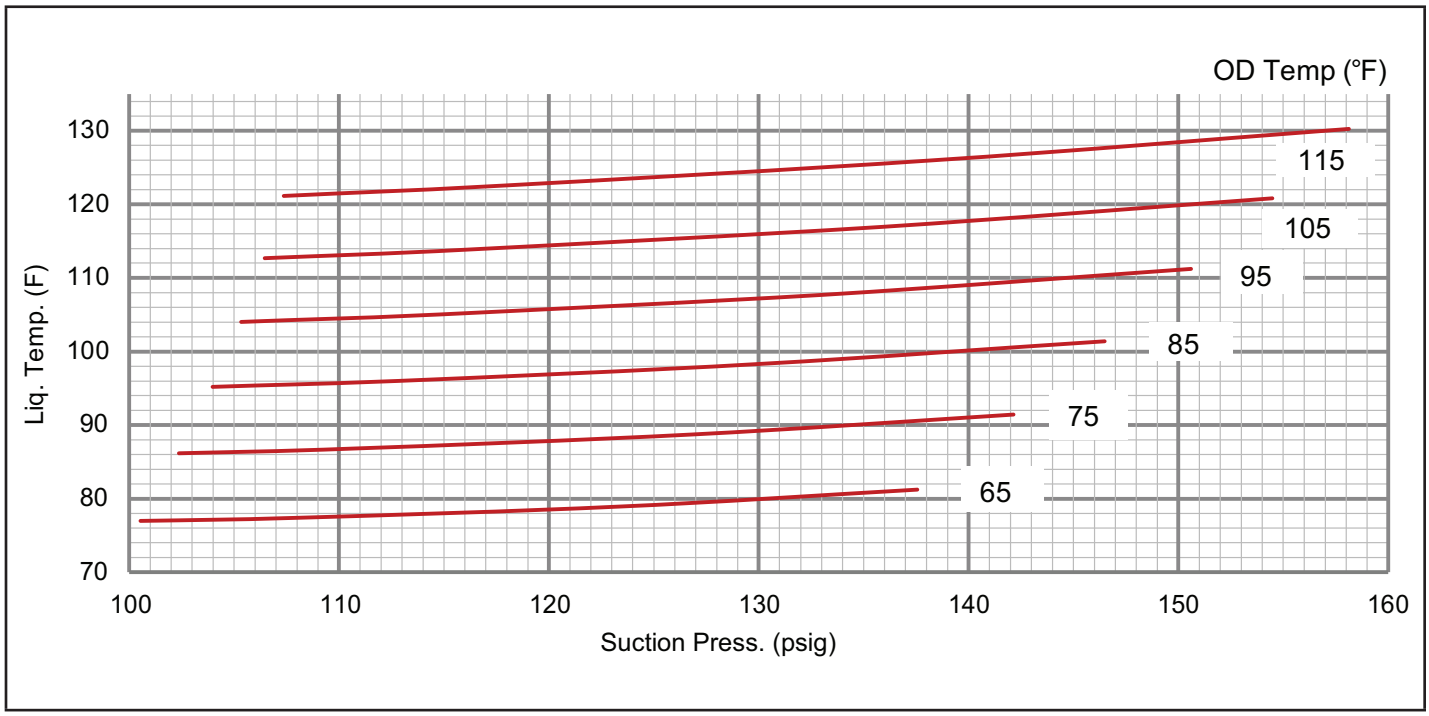
ZCD036 CHARGING CURVE - ALL-ALUMINUM COIL



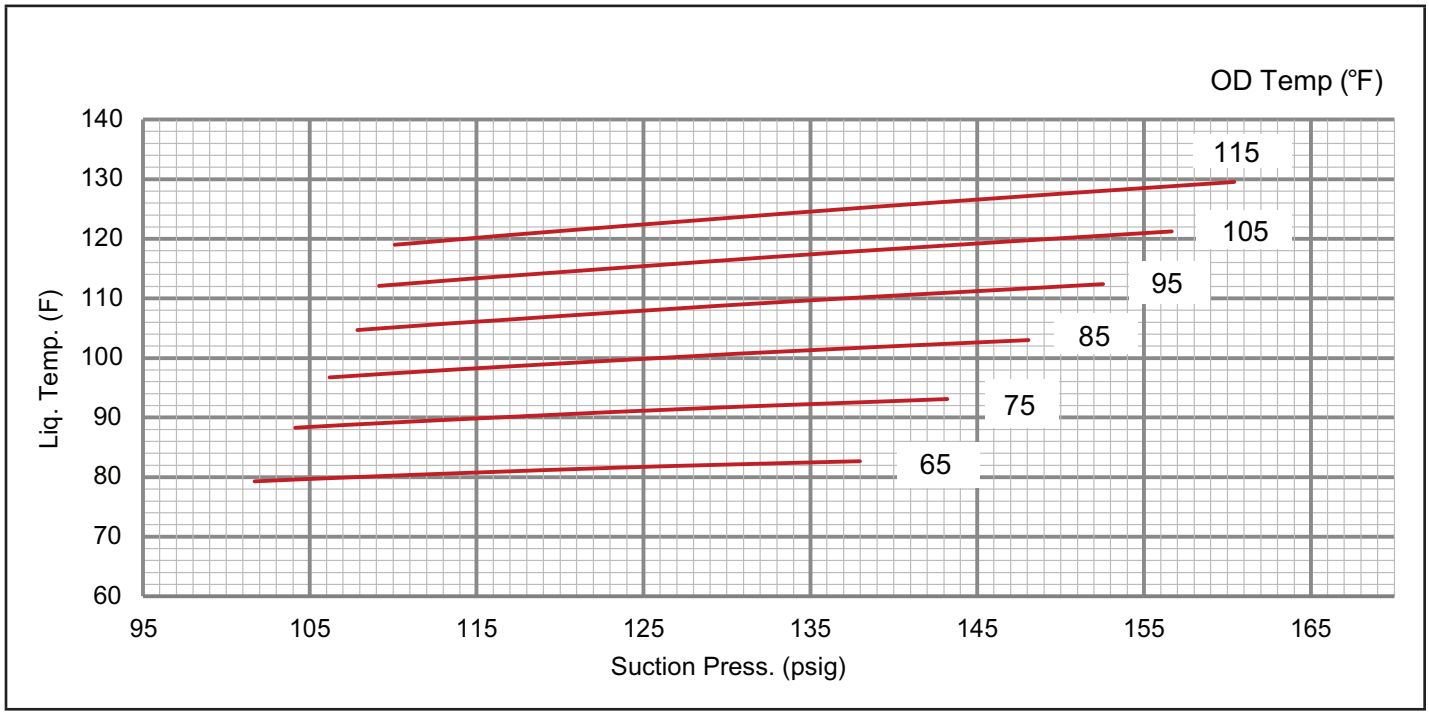
ZCD048 CHARGING CURVE - ALL-ALUMINUM COIL



ZCD060 CHARGING CURVE - ALL-ALUMINUM COIL



ZCD074 CHARGING CURVE - ALL-ALUMINUM COIL



V- SYSTEMS SERVICE CHECKS

A-Cooling System Service Checks

ZCD units are factory charged and require no further adjustment; however, charge should be checked periodically using the approach method. The approach method compares actual liquid temperature with the outdoor ambient temperature. See section IV- CHARGING.

NOTE-When unit is properly charged discharge line pressures should approximate those in TABLE 10 - TABLE 13.

VI-MAINTENANCE

The unit should be inspected once a year by a qualified service technician.

⚠ WARNING

Electric shock hazard. Can cause injury or death. Before attempting to perform any service or maintenance, turn the electrical power to unit OFF at disconnect switch(es). Unit may have multiple power supplies.

⚠ IMPORTANT

Label all wires prior to disconnection when servicing controls. Wiring errors can cause improper and dangerous operation. Verify proper operation after servicing.

⚠ WARNING

Any service personnel installing, decommissioning, or performing maintenance on the unit must be properly trained with A2L refrigerants

Prior to beginning work on systems containing refigerant to ensure the risk of ignition is minimized:

- All work shall be undertaken under a controlled procedure so as to minimize the risk of a flammable gas or vapor being present while the work is being performed.
- The area shall be checked with an appropriate refrigerant detector prior to and during work, to ensure the technician is aware of potentially toxic or flammable atmospheres. Ensure that the leak detection equipment being used is suitable for use with all applicable refrigerants, i. e. non-sparking, adequately sealed or intrinsically safe.
- If any hot work is to be conducted on the refrigerating equipment or any associated parts, the appropriate fire extinguishing equipment shall be available to hand. Have a dry powder or CO2 fire extinguisher adjacent to the charging area.
- No person carrying out work in relation to a refrigerating system which involves exposing any pipe work shall use any sources of ignition in such a manner that it may lead to the risk of fire or explosion. All possible ignition sources, including cigarette smoking, should be kept sufficiently far away from the site of installation, repairing, removing and disposal, during which refrigerant can possibly be released to the surrounding space. Prior to work taking place, the area around the equipment is to be surveyed to make sure that there are no flammable hazards or ignition risks. “No Smoking” signs shall be displayed.
- Ensure that the area is in the open or that it is adequately ventilated before breaking into the system or conducting any hot work.

A degree of ventilation shall continue during the period that the work is carried out. The ventilation should safely disperse any released refrigerant and preferably expel it externally into the atmosphere.

- Where electrical components are being changed, service technicians shall be fit for the purpose and to the correct specification. At all times the manufacturer’s maintenance and service guidelines shall be followed. If in doubt, consult the manufacturer’s technical department for assistance. The following checks shall be applied to installations using flameable refrigerants as applicable:

1 - The actual refrigerant charge is in accordance with the room size within which the refrigerant containing parts are installed.

2 - The ventilation machinery and outlets are operating adequately and are not obstructed.

3 - If an indirect refrigerating circuit is being used, the secondary circuit shall be checked for the presence of refrigerant.

4 - Markings on the equipment should be visible and legible. Markings and signs that are illegible shall be corrected.

5 - Refrigerating pipes or components are installed in a position where they are unlikely to be exposed to any substance which may corrode refrigerant containing components, unless the components are constructed of materials which are inherently resistant to being corroded or are suitably protected against being so corroded.For systems containing refigerant all repair and maintenance to electrical components shall include initial safety checks and component inspection procedures such as that capacitors are discharged in a safe manner to avoid possibility of sparking, that no live electrical components and wiring are exposed while charging, recovering, or purging the system, and that there is continuity of earth bonding. If a fault exists that could compromise safety, then no electrical supply shall be connected to the circuit until it is satisfactorily dealt with. If the fault cannot

be corrected immediately but it is necessary to continue operation, an adequate temporary solution shall be used that is reported to the owner of the equipment, so all parties are advised.

NOTE - *Sealed electrical components shall be replaced, not repaired.*

NOTE - *Intrinsically safe components must be replaced, not repaired.*

- Under no circumstances shall potential sources of ignition be used in the searching for or detection of refrigerant leaks. A halide torch (or any other detector using a naked flame) shall not be used. Electronic leak detectors may be used to detect refrigerant leaks but, in the case of flammable refrigerants, the sensitivity may not be adequate, or may need re-calibration. (Detection equipment shall be calibrated in a refrigerant-free area.) Ensure that the detector is not a potential source of ignition and is suitable for the refrigerant used. Leak detection equipment shall be set at a percentage of the LFL of the refrigerant and shall be calibrated to the refrigerant employed, and the appropriate percentage of gas (25 % maximum) is confirmed. Leak detection fluids are also suitable for use with most refrigerants but the use of detergents containing chlorine shall be avoided as the chlorine may react with the refrigerant and corrode the copper pipe-work. If a leak is suspected, all naked flames shall be removed/extinguished. If a leakage of refrigerant is found which requires brazing, all of the refrigerant shall be recovered from the system, or isolated (by means of shut off valves) in a part of the system remote from the leak.
- When breaking into the refrigerant circuit to make repairs – or for any other purpose – conventional procedures shall be used. However, for flammable refrigerants it is important that best practice be followed, since flammability is a consideration. The following procedure shall be adhered to:

  a. Safely remove refrigerant following local and national regulations,

  b. Evacuate the circuit,

  c. Purge the circuit with inert gas,

  d. Evacuate,

  e. Purge with inert gas,

  f. Open the circuit.
- The refrigerant charge shall be recovered into the correct recovery cylinders if venting is not allowed by local and national codes. For appliances containing flammable refrigerants, the system shall be purged with oxygen-free nitrogen to render the appliance safe for flammable refrigerants. This process might need to be repeated several times. Compressed air or oxygen shall not be used for purging refrigerant systems. Refrigerant purging shall be achieved by breaking the vacuum in the system with oxygen-free nitrogen and continuing to fill until the working pressure is achieved, then venting to atmosphere, and finally pulling down to a vacuum. This process shall be repeated until no refrigerant is within the system. When the final oxygen-free nitrogen charge is used, the system shall be vented down to atmospheric pressure to enable work to take place. Ensure that the outlet for the vacuum pump is not close to any potential ignition sources and that ventilation is available.

A-Filters

Units are equipped with temporary filters which must be replaced prior to building occupation. Refer to local codes or appropriate jurisdiction for approved filters. See TABLE 14 for filter sizes and quantities..

TABLE 14

Models	Filter (Qty.) Size
036-048	(4) 14 x 20 x 2
060-074	(2) 16 x 20 x 2
	(2) 20 x 20 x 2

To change filters, open filter access panel on back side of unit. See FIGURE 16. Lift filter stop to remove filters. See FIGURE 17.

⚠ WARNING

Units are shipped from the factory with temporary filters. Replace filters before building is occupied. Damage to unit could result if filters are not replaced with approved filters. Refer to appropriate codes.

Approved filters should be checked monthly and replaced when necessary. Take note of air flow direction marking on filter frame when reinstalling filters. See FIGURE 17.

NOTE-*Filters must be U.L.C. certified or equivalent for use in Canada.*

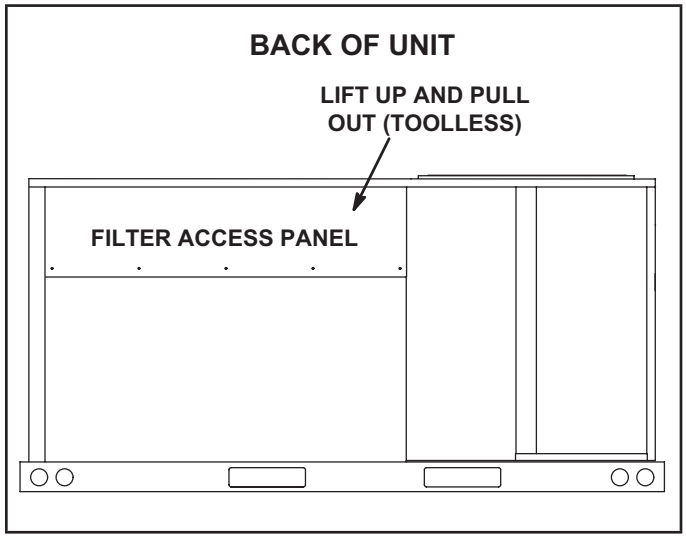


FIGURE 16

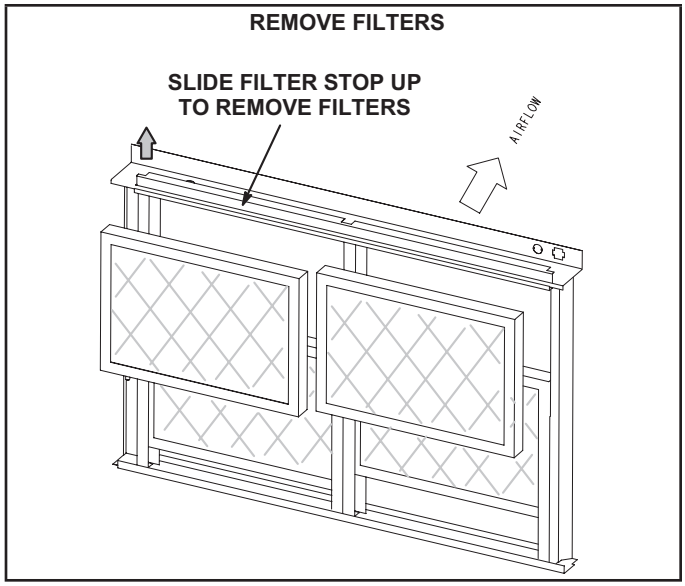


FIGURE 17

B-Lubrication

All motors are lubricated at the factory. No further lubrication is required.

C-Evaporator Coil

Inspect and clean coil at beginning of each cooling season. Clean using mild detergent or commercial coil cleanser. Flush coil and condensate drain with water taking care not to get insulation, filters and return air ducts wet.

D-Condenser Coil

Clean condenser coil annually with water and inspect monthly during the cooling season.

Note - *Do not use commercial coil cleaner on the all aluminum coil. Using anything other than water could result in corrosion and/or leaks.Clean the all-aluminum coil by spraying the coil steadily and uniformly from top to bottom. Do not exceed 900 psi or a 45 angle; nozzle must be at least 12 inches from the coil face. Take care not to fracture the braze between the fins and refrigerant tubes. Reduce pressure and work cautiously to prevent damage.*

E-Supply Blower Wheel

Annually inspect supply air blower wheel for accumulated dirt or dust. Turn off power before attempting to remove access panel or to clean blower wheel.

VII-ACCESSORIES

The accessories section describes the application of most of the optional accessories which can be factory or field installed to the ZCD units. OPTIONAL ACCESSORIES section (see table of contents) show specific size per unit.

A-Mounting Frames

When installing units on a combustible surface for downflow discharge applications, the Z1CURB roof mounting frame is used. The roof mounting frames are recommended in all other applications but not required. If the ZCD units are not mounted on a flat (roof) surface, they MUST be supported under all edges and under the middle of the unit to prevent sagging. The units MUST be mounted level within 1/16” per linear foot or 5mm per meter in any direction.

The assembled Z1CURB mounting frame is shown in FIGURE 18. Refer to the roof mounting frame installation instructions for details of proper assembly and mounting. The roof mounting frame MUST be squared to the roof and level before mounting. Plenum system MUST be installed before the unit is set on the mounting frame. Typical roof curbing and flashing is shown in FIGURE 19. Refer to the roof mounting frame installation instructions for proper plenum construction and attachment.

B-Transitions

Transitions are field-provided.

C-Supply and Return Diffusers

Optional flush mount diffuser/return FD11 and extended mount diffuser/return RTD11 are available for use with all ZCD units. Refer to manufacturer’s instructions included with transition for detailed installation procedures.

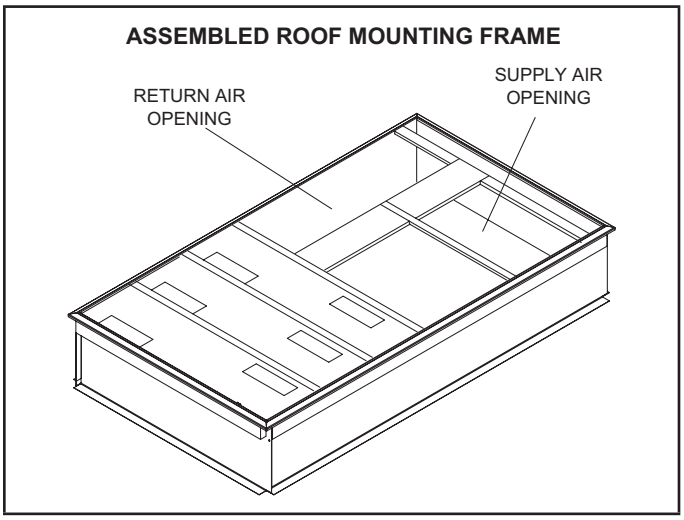


FIGURE 18

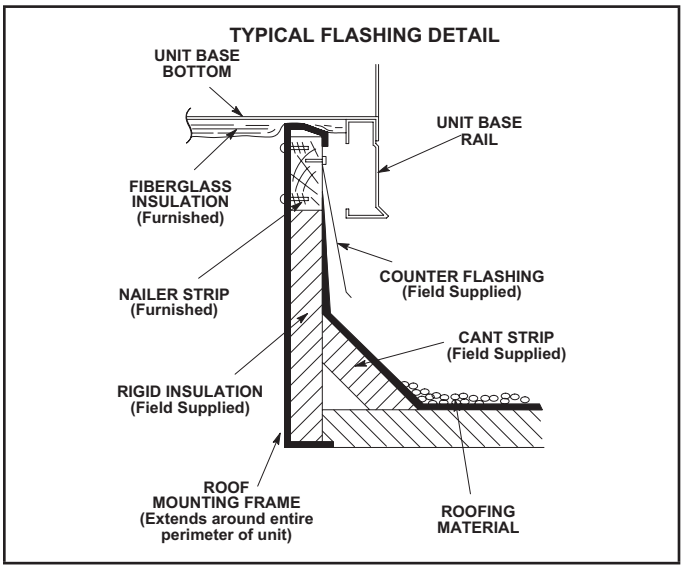


FIGURE 19

D-Economizer (Field or Factory Installed)

NOTE - *The following is an example of one economizer used. See Engineering Handbook for other economizers used and refer to the applicable economizer installation instruction for more detail.*

Economizers use outdoor air for free cooling when temperature and/or humidity is suitable. See FIGURE 20.

The mixed air temperature sensor (R1) measures the supply air sensible temperature. See FIGURE 21. The outdoor air sensible control is the default economizer control. An outdoor air single sensible sensor, S175, is also provided. See TABLE 15 for outdoor and return air (OA and RA) sensor options.

Refer to instructions provided with sensors for installation. An IAQ sensor is used when demand control ventilation (DCV) is specified. Damper minimum position can be set lower than traditional minimum air requirements resulting in cost savings. The IAQ sensor allows the A6 to open dampers to traditional ventilation requirements as room occupancy (CO2) increases.

TABLE 15

Sensors	**Dampers will modulate to 55°F discharge air (RT6) when:**
Single OA Sensible	OA temperature (S175) is lower than free cooling setpoint.
Single OA Sensible	OA temperature and humidity (A7) is lower than free cooling setpoint
Differential Enthalpy - 1 in OA and 1 in RA	OA temperature and humidity (A7) is lower than RA temperature and humidity (A62).
IAQ Sensor	CO_2 sensed (A63) is higher than CO_2 setpoint.

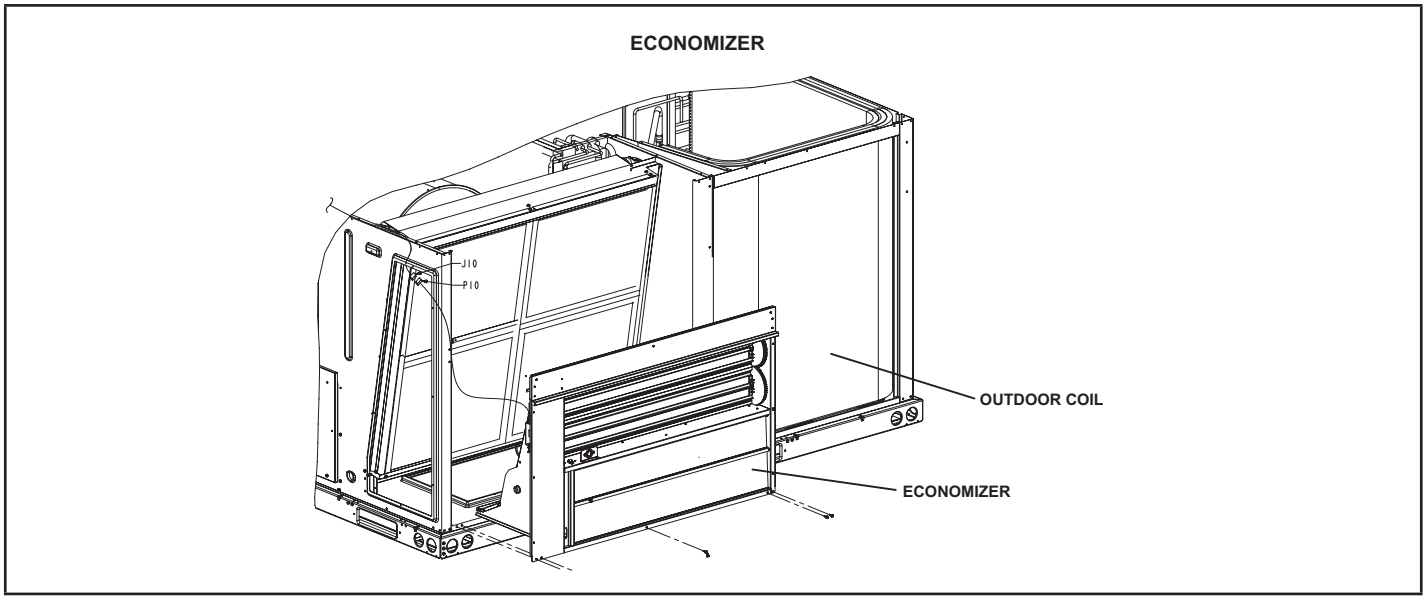


FIGURE 20

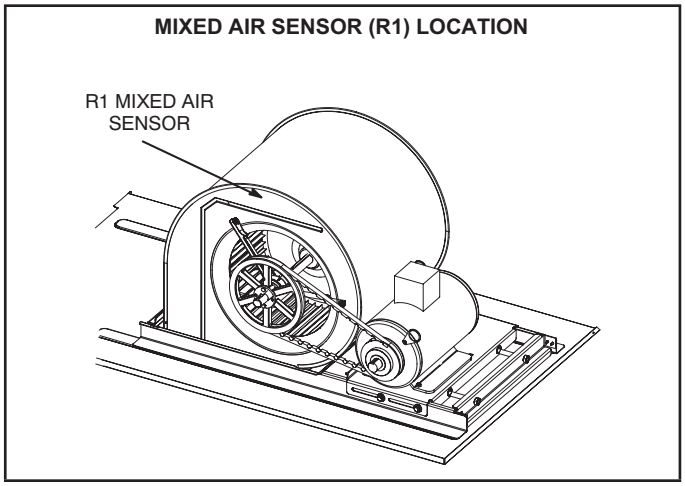


FIGURE 21

A6 Enthalpy Control LED'S

A steady green Free Cool LED indicates that outdoor air is suitable for free cooling. When an optional IAQ sensor is installed, a steady green DCV LED indicates that the IAQ reading is higher than setpoint requiring more fresh air. See FIGURE 22.

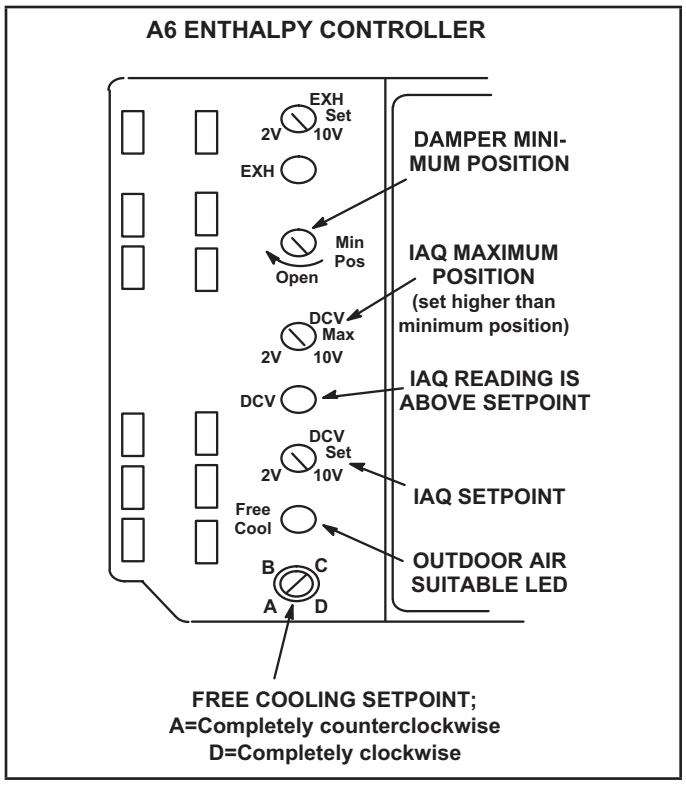


FIGURE 22

Free Cooling Setpoint

Outdoor air is considered suitable when temperature and humidity are less than the free cooling setpoints shown in TABLE 16. Setting A is recommended. At setting A, free cooling will be energized when outdoor air is approximately 73°F (23°C) and 50% relative humidity. If indoor air is too warm or humid, lower the setpoint to B. At setting B, free cooling will be energized at 70°F (21°C) and 50% relative humidity.

When an optional A62 differential sensor is installed, turn A6 enthalpy control free cooling setpoint potentiometer completely clockwise to position "D".

TABLE 16

ENTHALPY CONTROL SETPOINTS

Control Setting	Free Cooling Setpoint At 50% RH
A	73° F (23° C)
B	70° F (21° C)
C	67° F (19° C)
D	63° F (17° C)

Damper Minimum Position

NOTE - *A jumper is factory-installed between TB1 R and OC terminals to maintain occupied status (allowing minimum fresh air). When using an electronic thermostat or energy management system with an occupied/unoccupied feature, remove jumper.*

1 - Set thermostat to occupied mode if the feature is available. Make sure jumper is in place between TB1 terminals R and OC if using a thermostat which does not have the feature.

2 - Rotate MIN POS SET potentiometer to approximate desired fresh air percentage.

Note - *Damper minimum position can be set lower than traditional minimum air requirements when an IAQ sensor is specified. Dampers will open to DCV MAX setting (if CO2 is above setpoint) to meet traditional ventilation requirements.*

3 - Measure outdoor air temperature. Mark the point on the bottom line of chart 1 and label the point "A" (40F, 4C shown).

4 - Measure return air temperature. Mark that point on the top line of chart 1 and label the point "B" (74F, 23C shown).

5 - Measure mixed air (outdoor and return air) temperature. Mark that point on the top line of chart 1 and label point "C" (70F, 21C shown).

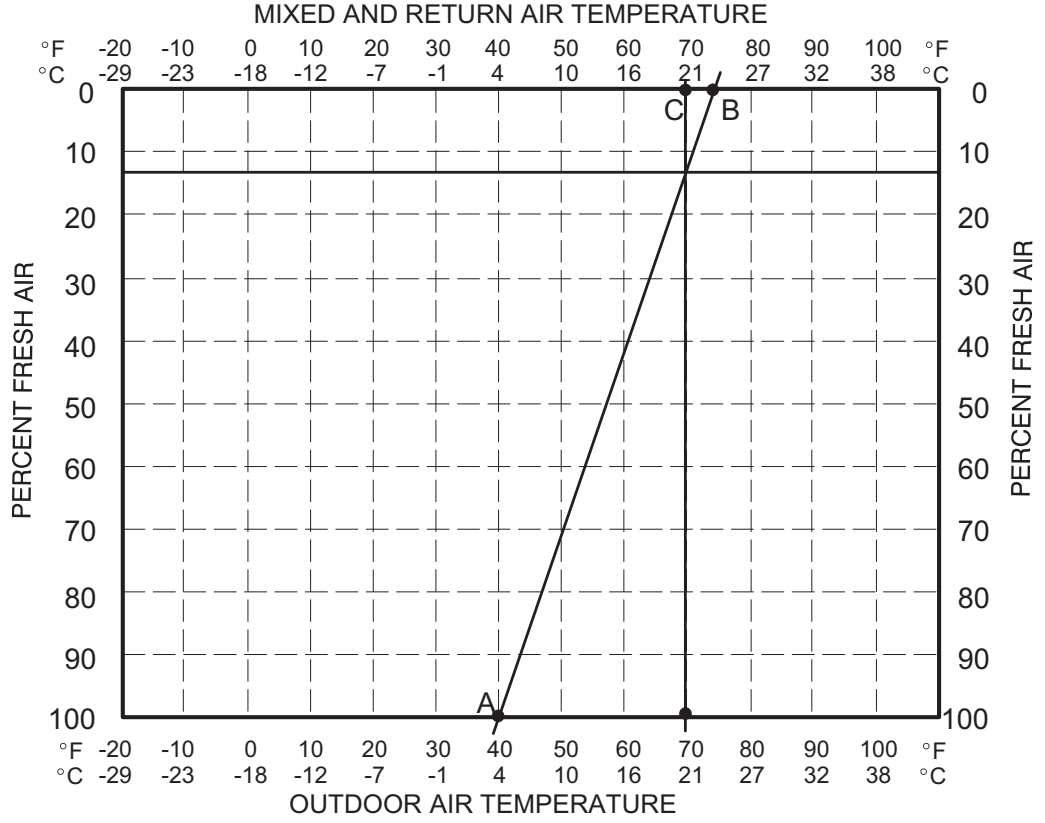
6 - Draw a straight line between points A and B.

7 - Draw a vertical line through point C.

8 - Draw a horizontal line where the two lines meet. Read the percent of fresh air intake on the side.

9 - If fresh air percentage is less than desired, adjust MIN POS SET potentiometer higher. If fresh air percentage is more than desired, adjust MIN POS SET potentiometer lower. Repeat steps 3 through 8 until calculation reads desired fresh air percentage

CHART 1
CALCULATE MINIMUM FRESH AIR PERCENTAGE



DCV Set and Max Settings

Adjust settings when an optional IAQ sensor is installed. The DCV SET potentiometer is factory-set at approximately 50% of the potentiometer range. Using a standard 1-2000ppm CO2 sensor, dampers will start to open when the IAQ sensor reads approximately 1000ppm. Adjust the DCV SET potentiometer to the approximate setting specified by the controls contractor. Refer to FIGURE 22.

The DCV MAX potentiometer is factory-set at approximately 50% of the potentiometer range or 6VDC. Dampers will open approximately half way when CO2 rises above setpoint.

Adjust the DCV MAX potentiometer to the approximate setting specified by the controls contractor. Refer to FIGURE 22.

Note - *DCV Max must be set higher than economizer minimum position setting for proper demand control ventilation.*

Economizer Operation

The occupied time period is determined by the thermostator energy management system.

Outdoor Air Not Suitable:

During the unoccupied time period dampers are closed. During the occupied time period a cooling demand will open dampers to minimum position and mechanical cooling functions normally.

During the occupied time period dampers will open to DCV MAX when IAQ reading is above setpoint (regardless of thermostat demand or outdoor air suitability).

Outdoor Air Suitable:

See TABLE 17 for economizer operation with a standard two-stage thermostat.

During the occupied period, dampers will open to DCV MAX when IAQ reading is above setpoint (regardless of thermostat demand or outdoor air suitability). DCV MAX will NOT override damper full-open position. When an R1 mixed air sensor for modulating dampers is installed, DCV

MAX may override damper free cooling position when occupancy is high and outdoor air temperatures are low. If R1 senses discharge air temperature below 45ºF (7ºC), dampers will move to minimum position until discharge air temperature rises to 48ºF (9ºC).

TABLE 17

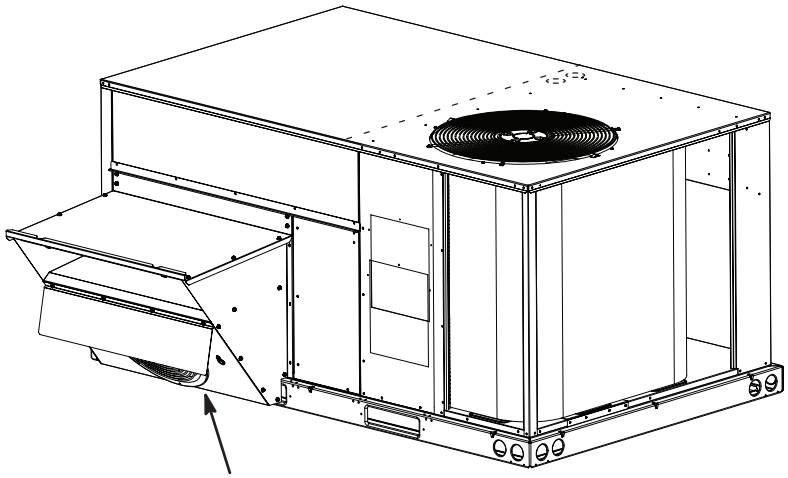
ECONOMIZER OPERATION-OUTDOOR AIR IS **SUITABLE** FOR FREE COOLING -- FREE COOL LED “ON”

Thermostat Demand	Damper Position		Mechanical Cooling
	Unoccupied	**Occupied**	
Off	Closed	Closed	No
G	Closed	Minimum	No
Y1	Open*	Open*	No
Y2	Open*	Open*	Stage 1

* Dampers will open to maintain 55°F (13°C) supply air when an R1 mixed air sensor is installed.

POWER EXHAUST FANS

HORIZONTAL



POWER EXHAUST FAN

DOWNFLOW

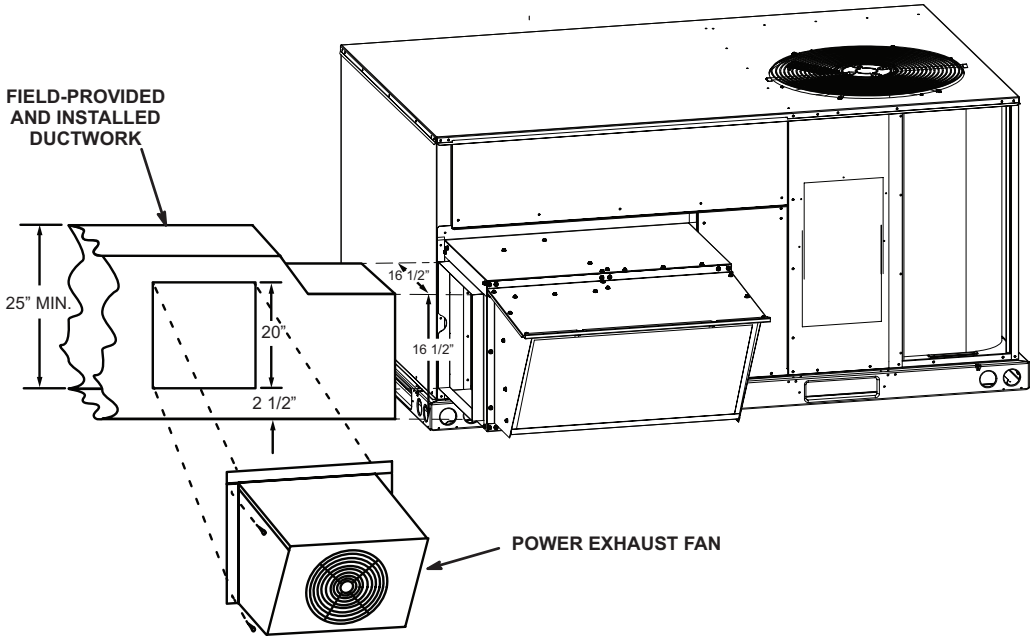


FIGURE 23

Standard Economizer Down Flow and Horizontal

The standard economizer is used with ZCD 036-074 units in downflow air discharge applications. Economizer dampers will modulate to maintain 55°F (13°C) supply air when outdoor air is suitable. The mixed air temperature sensor measures the supply air sensible temperature. An outdoor air sensor is used to determine whether outdoor air is suitable for free cooling. The outdoor air sensor is factory installed in all economizers. Other outdoor and return air (OA and RA) sensor options are available to determine whether outdoor air is suitable for free.

Wiring

1 - The economizer control module is located below the actuator for shipping. Relocate the control to the unit control box, see FIGURE 24.

1 - Route the control wires to unit terminal block (TB1) and connect these wires to TB1 as following (see FIGURE 24):

- Connect all female terminals to TB1 - Pink (24V) to R; Grey (GND) to ground; Yel (Cool 1) to Y1; and Blue (Cool 2) to Y2.
- Disconnect the factory installed terminals at TB1, Y1 and Y2. Connect these terminals to control male terminal Y1 and Y2

2 - Attach the control harness jack (J142) to pre-wired harness plug (P142).

3 - At economizer/filter compartment, attach economizer plug(P10) to pre-wired harness jack (J10). See FIGURE 20.

4 - Connect any optional sensors as shown in FIGURE 25.

5 - If optional power exhaust is used, wire according to instructions provided with power exhaust. See FIGURE 25.

6 - Apply wiring diagram to the control panel.

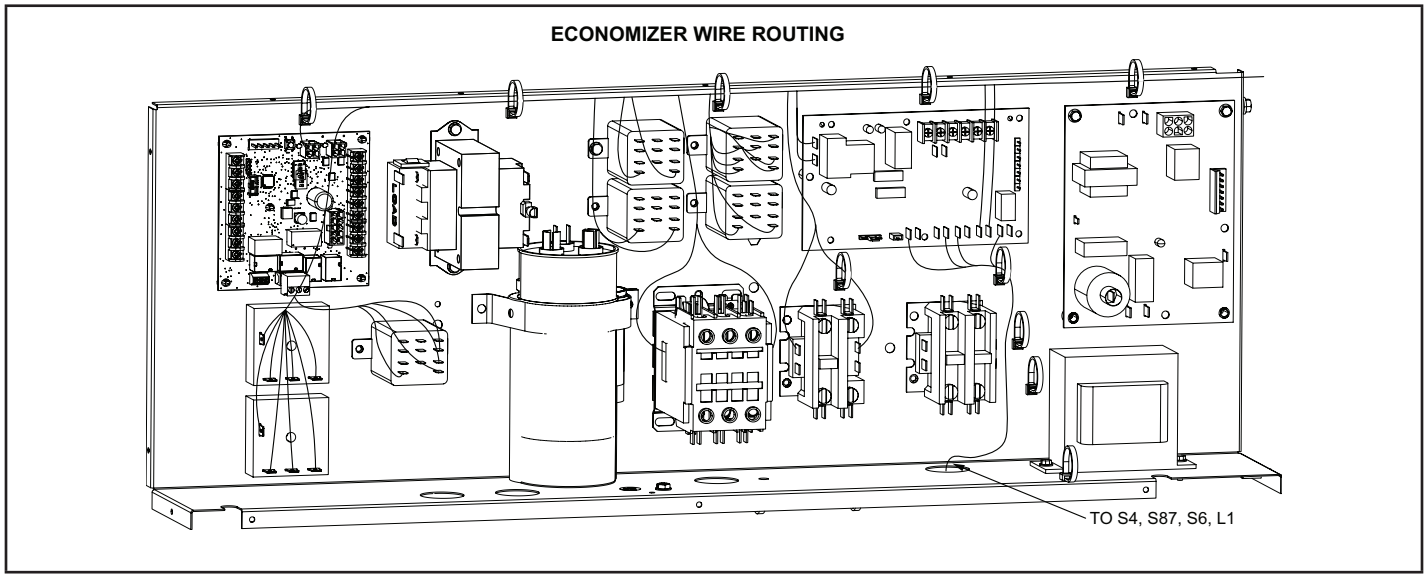


FIGURE 24

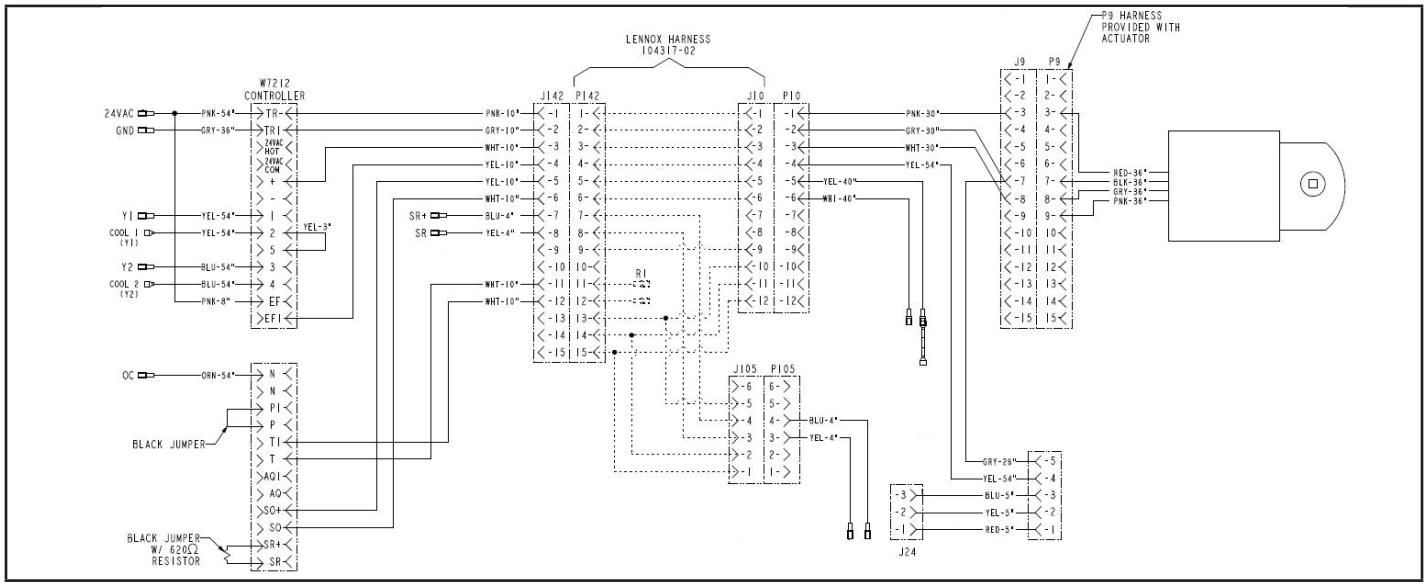


FIGURE 25

High Performance Economizer

USER INTERFACE

See FIGURE 26.

1 - One-line LCD. After a period of inactivity, the controller displays the default HMI screen (free cooling status: “1FREECOOL YES” or “1FREECOOL NO”).

2 - Operation button (Up button) - Move to the previous value, step or category.

3 - Operation button (Down button)- Move to the next value, step or category.

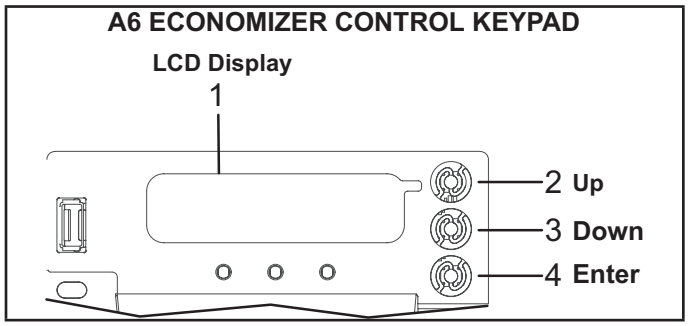


FIGURE 26

4 - Operation button (Enter button):

- Press to edit the current value or option.
- Press to confirm a newly selected value or option.
- Press Enter + Up to jump up one entire category.
- Press Enter + Down to jump down one entire category.

MENU STRUCTURE

See FIGURE 27.

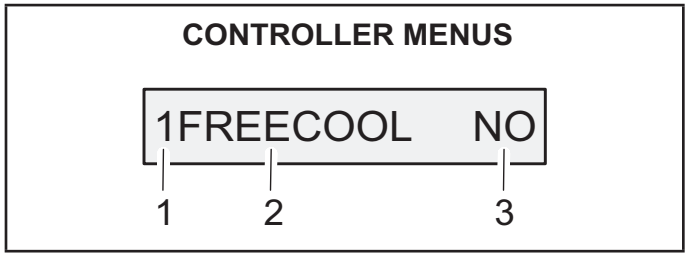


FIGURE 27

1 - Menus are displayed in the Economizer Controller as per categories. There are eight first-level menus. Each menu is represented by a number at the beginning of the line on the LCD. Press Enter + Up or Down to toggle between different first-level menus.

- 1: Status Display
- 2: Basic Settings
- 3: Advanced Settings
- 4: Alarms
- 5: Enter Configuration State and Reset
- 6: I/O Config.
- 7: Testing
- 8: Enter Running State

2 - Sub-menus follow the numbered first-level menus closely. Pressing Up or Down can toggle between different sub-menus.

3 - At the end of the line, the LCD displays the value of the current sub-menu (if any). Enter the Edit mode by pressing Enter (if the value is editable). Press Up or Down to change the highlighted value. Press Enter to confirm the change and exit the Edit mode.

For a complete list of parameters refer to the Siemens installation manual provided in this kit.

FREE COOLING SETPOINT

Single OA Sensible Sensing (Default)

The default free cooling setpoint or high limit setpoint is 63°F. This means that the outdoor air is suitable for free cooling at 62°F and below and not suitable at 64°F and above. This setpoint is adjustable.

For California Title 24 compliance, adjust the free cooling setpoint based on:

- The climate zone where the unit is installed. See TABLE 18.
- The setpoint requirement published by the California Energy Commission. See Section 140.4 - Prescriptive Requirements for Space Conditioning Systems of the 2013 Building Energy Efficiency Standards.

NOTE - *Values in the referenced standard will supersede values listed in* TABLE 18*.*

TABLE 18

FREE COOLING SETPOINT - SINGLE SENSIBLE

Climate Zone	Setpoint
1, 3, 5, 11-16	75°F
2, 4, 10	73°F
6, 8, 9	71°F
7	69°F

To adjust the setpoint, navigate to the “BASIC SETTINGS” menu and change the “2TEMP OFF” parameter accordingly.

Single OA Enthalpy Sensing (Optional)

To adjust the enthalpy setpoint, navigate to the “*BASIC SETTINGS*” menu and change the “*2ENTH OFF*” parameter accordingly.

Differential Sensing (Optional)

Two sensors can be used to compare outdoor air to return air. When outdoor air is cooler than return air, outdoor air is suitable for free cooling. When return air is cooler than outdoor air, the damper will modulate to the minimum position.

SETUP AND CONFIGURATION - FACTORY-INSTALLED ECONOMIZER

Program the following parameters into the controller. Navigate to the specific menus to make the changes required.

1INS	(MM/DD/YY) enter installation date
2FAN L ACT*	( ) adjust VDC value until desired fresh air setpoint is reached when fan runs at low speed. **Appears only if unit is configured as 2SPEED*.
2FAN H ACT	( ) adjust VDC value until desired fresh air setpoint is reached

SETUP AND CONFIGURATION - FIELD-INSTALLED ECONOMIZER

Program the following parameters into the controller. Navigate to the specific menus to make the changes required.

IMPORTANT - Before setup and configuration, it is recommended to obtain some location-based values such as shutoff points or utilize the location services in the Climatix mobile application.

Menus are displayed in the Economizer Controller as per categories. There are eight first-level menus. Each of them is represented by a number at the beginning of the line on the LCD. Press Enter + Up or Down to toggle between different first-level menus.

Navigate to the applicable menus and set the following parameters based on the unit configuration:

1INS	(MM/DD/YY) enter installation date
2FAN L ACT	( ) adjust VDC value until desired fresh air set point is reached when fan runs at low speed (**Appears only if unit is configured as 2SPEED*)
2FAN H ACT	( ) adjust VCD value until desired fresh air set point is reached
3STG3 DLY	(120)
6Y2O	(NONE) For single-stage units (COOL 2) For 2-stage units
6FAN	(1 SPEED) For CAV units (2 SPEED) For MSAV units

E-Power Exhaust Fan

The power exhaust fan (PEF) requires an optional gravity exhaust damper and economizer and is used in downflow applications only. See FIGURE 23. The PEF provides exhaust air pressure relief and also runs when return air dampers are closed and the supply air blower is operating. See installation instructions for more detail.

Power Exhaust Setpoint Adjustment

Locate the A6 enthalpy control in the control area. The EXH SET potentiometer is factory-set at approximately 50% of the dial range. See FIGURE 28. Power exhaust fans will be energized 30 seconds after dampers are 50% open. Adjust the EXH SET potentiometer higher (clockwise toward 10V) to energize fans when dampers are further open. Adjust the EXH SET potentiometer lower (counterclockwise toward 2V) to energize fans when dampers are further closed. (Thirty-second delay allows dampers to partially open before exhaust fan starts.)

F-Drain Pan Overflow Switch S149 (option)

The overflow switch is used to interrupt cooling operation when excessive condensate collects in the drain pan. The N.O. overflow switch is controlled by K220 and DL46 relays, located in the unit control panel.

When the overflow switch closes, 24VAC power is interrupted and after a five second delay unit compressors are de-energized. Once the condensate level drops below the set level, the switch will open. After a five-minute delay the compressor will be energized.

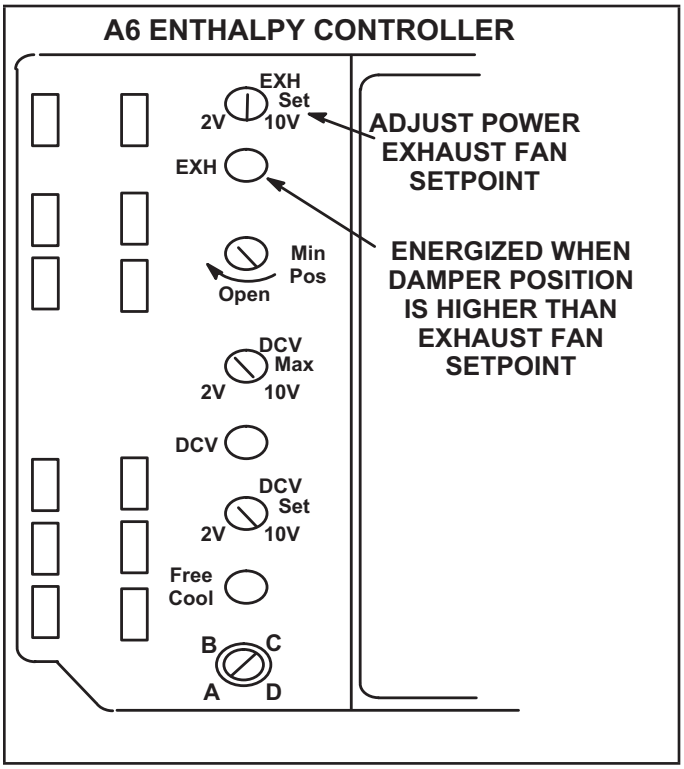
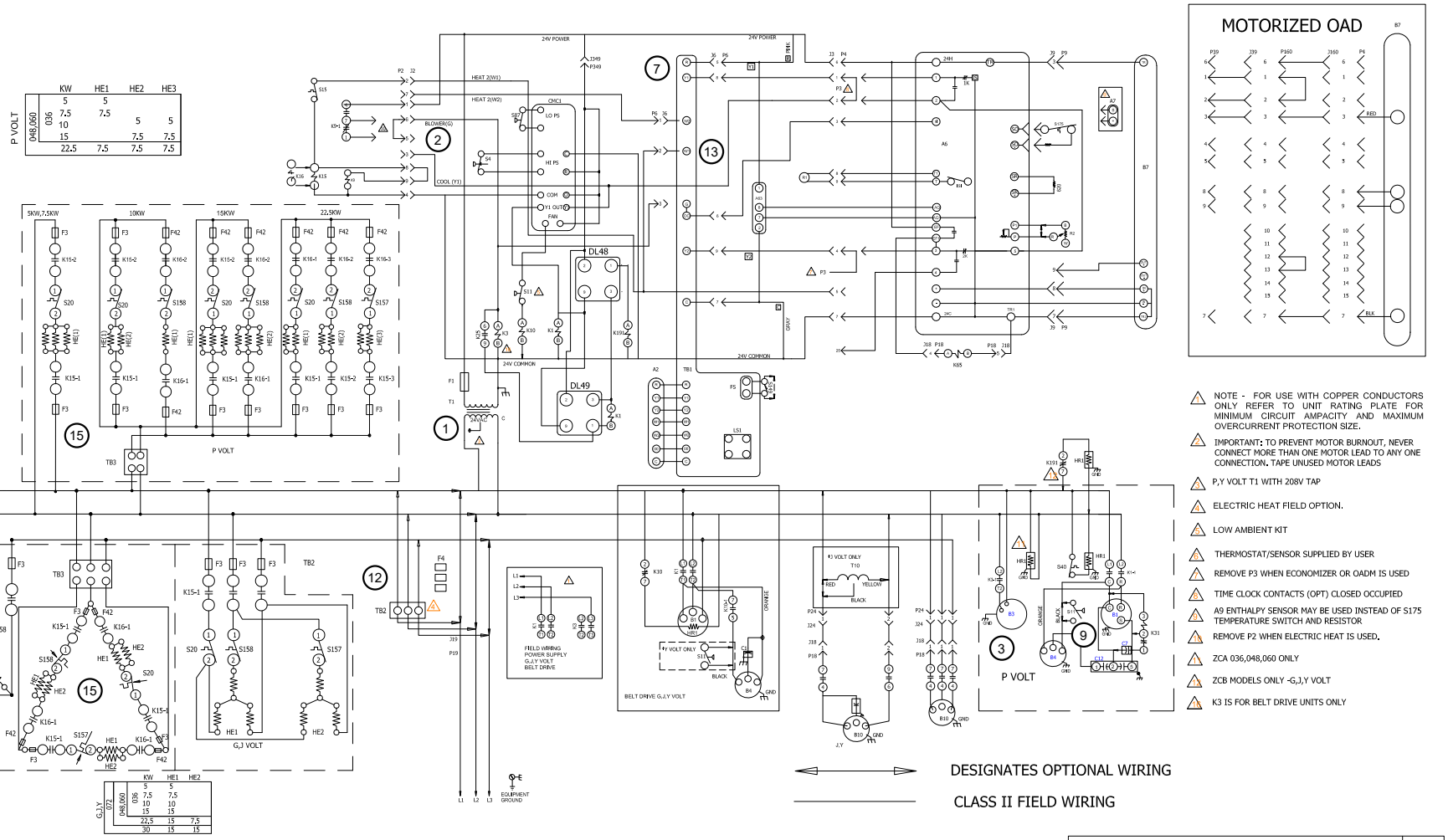


FIGURE 28

ZCD 036-060 UNIT DIAGRAM



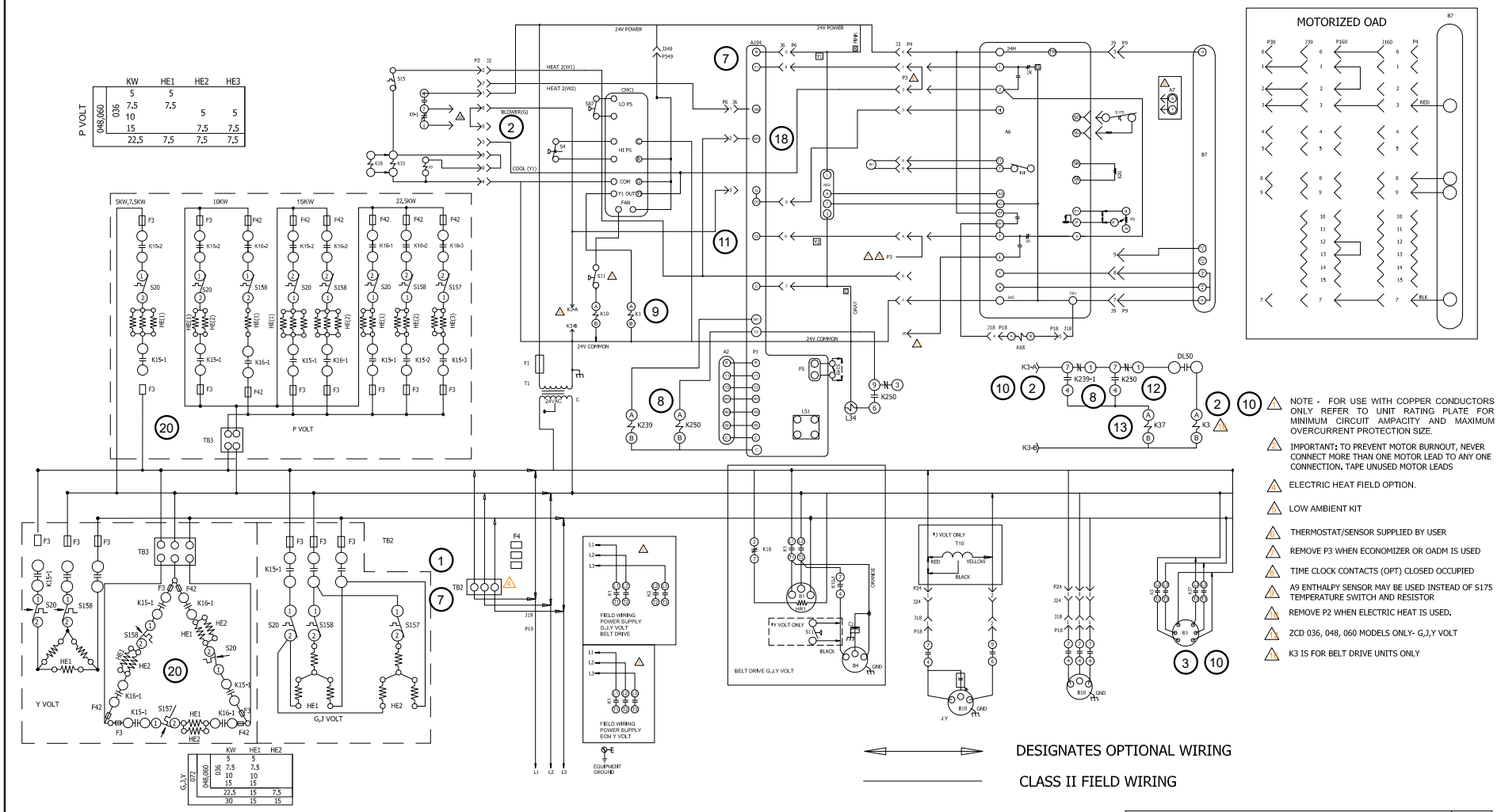
P VOLT		KW	HE1	HE2	HE3
048,060	036	5	5		
		7.5	7.5		
		10		5	5
		15		7.5	7.5
		22.5	7.5	7.5	7.5

G,J,Y	072	048,060	036	KW	HE1	HE2
				5	5	
				7.5	7.5	
				10	10	
				15	15	
				22.5	15	7.5
				30	15	15

1. NOTE - FOR USE WITH COPPER CONDUCTORS ONLY REFER TO UNIT RATING PLATE FOR MINIMUM CIRCUIT AMPACITY AND MAXIMUM OVERCURRENT PROTECTION SIZE.
2. IMPORTANT: TO PREVENT MOTOR BURNOUT, NEVER CONNECT MORE THAN ONE MOTOR LEAD TO ANY ONE CONNECTION. TAPE UNUSED MOTOR LEADS
3. P,Y VOLT T1 WITH 208V TAP
4. ELECTRIC HEAT FIELD OPTION.
5. LOW AMBIENT KIT
6. THERMOSTAT/SENSOR SUPPLIED BY USER
7. REMOVE P3 WHEN ECONOMIZER OR OADM IS USED
8. TIME CLOCK CONTACTS (OPT) CLOSED OCCUPIED
9. A9 ENTHALPY SENSOR MAY BE USED INSTEAD OF S175 TEMPERATURE SWITCH AND RESISTOR
10. REMOVE P2 WHEN ELECTRIC HEAT IS USED.
11. ZCA 036,048,060 ONLY
12. ZCB MODELS ONLY -G,J,Y VOLT
13. K3 IS FOR BELT DRIVE UNITS ONLY

2025/05	WIRING DIAGRAM 538560-01	05/25
	COOLING UNIT DIAGRAM	
	ZCD-036-060	
	SECTION B	REV A
Supersedes 538305-01	New Form No. 538560-01	

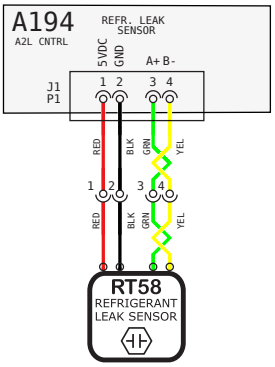
ZCD 074 UNIT DIAGRAM



NOTE - FOR USE WITH COPPER CONDUCTORS ONLY REFER TO UNIT RATING PLATE FOR MINIMUM CIRCUIT AMPACITY AND MAXIMUM OVERCURRENT PROTECTION SIZE.

1. IMPORTANT: TO PREVENT MOTOR BURNOUT, NEVER CONNECT MORE THAN ONE MOTOR LEAD TO ANY ONE CONNECTION. TAPE UNUSED MOTOR LEADS
2. ELECTRIC HEAT FIELD OPTION.
3. LOW AMBIENT KIT
4. THERMOSTAT/SENSOR SUPPLIED BY USER
5. REMOVE P3 WHEN ECONOMIZER OR OADM IS USED
6. TIME CLOCK CONTACTS (OPT) CLOSED OCCUPIED
7. A9 ENTHALPY SENSOR MAY BE USED INSTEAD OF S175 TEMPERATURE SWITCH AND RESISTOR
8. REMOVE P2 WHEN ELECTRIC HEAT IS USED.
9. ZCD 036, 048, 060 MODELS ONLY- G,J,Y VOLT
10. K3 IS FOR BELT DRIVE UNITS ONLY

2025/05	WIRING DIAGRAM 538559-01		05/25
COOLING-MSAV-2 SPEED			
ZCD-074			
SECTION B			REV A
Supersedes 538305-01		New Form No. 538559-01	



KEY LIST	
COMPONENT	**DESCRIPTION**
A194	CONTROL, REFR. LEAK DETECTION
RT58	SENSOR, REFR. LEAK DETECTION

WARNING

DISCONNECT ALL POWER BEFORE SERVICING.

ELECTRIC SHOCK HAZARD, CAN CAUSE INJURY OR DEATH. UNIT MUST BE GROUNDED IN ACCORDANCE WITH NATIONAL AND LOCAL CODES.

FOR USE WITH COPPER CONDUCTORS ONLY. REFER TO UNIT RATING PLATE FOR MINIMUM CIRCUIT AMPACITY AND MAXIMUM OVERCURRENT PROTECTION SIZE.

IF ANY WIRE IN THIS APPLIANCE IS REPLACED, IT MUST BE REPLACED WITH WIRE OF LIKE SIZE, RATING AND INSULATION THICKNESS.

MODEL: ZC/ZG/ZH
A2L SENSOR DIAGRAM
VOLT: All
SUPSDS: N/A NO: 538618-01 Rev 0

3 x 7
CUT SIZE

REV	EC NO.	DATE	BY	APVD	REVISION NOTE
---	CN-012849P	04-23-2025	ZN	STT	ORIGINATED AT PD&R CARROLLTON, TX

ZCD036, 048, 060 P, Y, G, J & M Voltage Sequence of Operation

Power:

1 - Line voltage from unit disconnect energizes transformer T1. T1 provides 24VAC power to the unit cooling, heating and blower controls.

Blower Operation:

2 - Indoor thermostat terminal G energizes blower contactor K3 with 24VAC.

3 - N.O. K3 closes, energizing blower B3.

Economizer Operation:

4 - The A6 economizer control module receives a Y1 thermostat demand. If outdoor air is suitable, economizer modulates open (see TABLE 17 in VII-ACCESSORIES section).

Power Exhaust Fan Operation:

5 - The A6 economizer control module receives a Y1 thermostat demand and energizes exhaust fan relay K65 with 24VAC at 50% outside air damper open (adjustable).

6 - N.O. K65-1 closes, energizing exhaust fan motor B10.

Cooling Demand

7 - First stage cooling demand Y1 and G is energized by the thermostat. G energizes blower.

8 - 24VAC is routed through low voltage Y1 lead to high pressure switch S4 and N.C. compressor high temperature limit S5. Compressor contactor K1 is energized.

9 - N.O. K1-1 close energizing compressor B1 and outdoor fan B4.

End of Cooling Demand

10 - Cooling demand is satisfied. Thermostat terminal Y1de-energizes

11 - Compressor K1 is de-energized. N.O. K1 contactor opens de-energizing compressor B1 and outdoor fan B4. (KCA072 Only - K191 energizes the crankcase heater.)

ZCB Models Only:

12 - De-energizing K1 initiates delay timer DL49. DL49 energizes relay K25 which closes blower contactor B3. Blower is de-energized after 30 second delay.

13 - De-energizing K1 initiates delay timer DL48. DL48 energizes relay K191, energizing the crankcase heater after a 30 minute delay.

Heating Demand:

14 - Terminal Strip TB2 is energized when the unit disconnect closes. TB2 supplies line voltage to TB3 or F3. Elements are protected by fuses F3 and F42.

15 - Heating demand initiates at W1 in thermostat.

16 - 24VAC is routed from the indoor thermostat through N.C. primary limit S15. Electric heat contactors K15, K16 (on P volt 10 and 22.5kW heaters) and heat relay K9 are energized. K9 energizes blower contactor K3 and economizer.

17 - N.O. contacts K15-1, K15-2, K16-1 and K16-2 close energizing HE1, HE2 and HE3.

End of Heating Demand:

18 - Heating demand is satisfied. Terminal W1 in the thermostat is de-energized.

19 - Electric heat contactors K15 and K16 are de-energized.

20 - N.O. contacts K15-1, K15-2, K16-1 and K16-2 open de-energizing HE1, HE2 and HE3.

ZCD074 P, Y, G, & J Voltage Sequence of Operation

Power:

1 - Line voltage from unit disconnect energizes transformer T1. T1 provides 24VAC power to the unit cooling, heating and blower controls.

Blower Operation:

2 - Indoor thermostat terminal G energizes blower contactor K3 with 24VAC.

3 - N.O. K3 closes, energizing blower B3.

Economizer Operation:

4 - The A6 economizer control module receives a Y1 thermostat demand. If outdoor air is suitable, economizer modulates open (see TABLE 17 in VII-ACCESSORIES section).

Power Exhaust Fan Operation:

5 - The A6 economizer control module receives a Y1 thermostat demand and energizes exhaust fan relay K65 with 24VAC at 50% outside air damper open (adjustable).

6 - N.O. K65-1 closes, energizing exhaust fan motor B10.

Cooling Demand ZCD074

First Stage:

7 - First stage cooling demand Y1 and G is energized by the thermostat. G energizes blower.

8 - 24VAC is routed through low voltage Y1 lead to high pressure switch S4 and N.C. compressor high temperature limit S5, relay K239, relay K250 and delay timer DL3 energizing low speed blower contactor K3. Compressor contactor K1 is energized.

9 - K1 closes energizing compressor B1 and outdoor fan B4.

10 - K3 closes energizing blower B3 in low speed.

Second Stage:

11 - Y2 and G is energized by indoor thermostat

12 - 24VAC is routed through low voltage Y2 lead to K250 energizing high speed blower contactor K37..

13 - K37 closes energizing blower B3 on high speed.

End of Cooling Demand

14 - Cooling demand is satisfied. Thermostat terminals Y1 and Y2 de-energize.

15 - Compressor K1 is de-energized. N.O. K1 contactor opens de-energizing compressor B1 and outdoor fan B4.

16 - De-energizing compressor contactor K1 energizes K191. K191 energizes the crankcase heater.

Heating Demand:

17 - Terminal Strip TB2 is energized when the unit disconnect closes. TB2 supplies line voltage to TB3 or F3. Elements are protected by fuses F3 and F42.

18 - Heating demand initiates at W1 in thermostat.

19 - 24VAC is routed from the indoor thermostat through N.C. primary limit S15. Electric heat contactors K15, K16 (on P volt 10 and 22.5kW heaters) and heat relay K9 are energized. K9 energizes blower contactor K3 and economizer.

20 - N.O. contacts K15-1, K15-2, K16-1 and K16-2 close energizing HE1, HE2 and HE3.

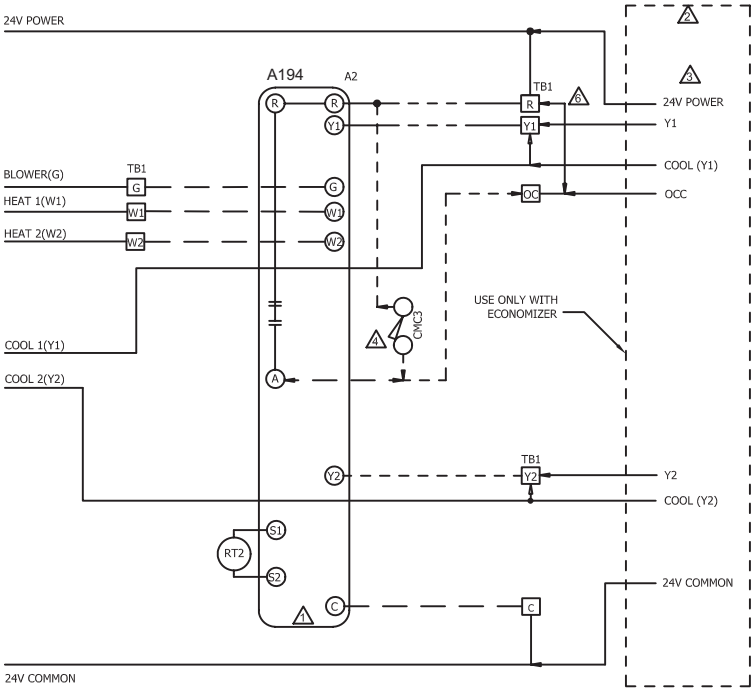
End of Heating Demand:

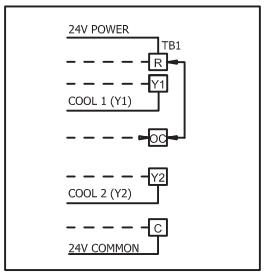
21 - Heating demand is satisfied. Terminal W1 in the thermostat is de-energized.

22 - Electric heat contactors K15 and K16 are de-energized.

23 - N.O. contacts K15-1, K15-2, K16-1 and K16-2 open de-energizing HE1, HE2 and HE3.

ELECTRONIC OR ELECTROMECHANICAL THERMOSTAT





CONNECTION SCHEME FOR ZCD, ZGD AND ZHD 092 THROUGH 150 UNITS WITHOUT ECONOMIZER ONLY

KEY	COMPONENT
A2	SENSOR, ELECTRONIC THERMOSTAT
A63	SENSOR, CO2
CMC3	CLOCK, TIME
K65	RELAY, EXHAUST FAN
R1	SENSOR, MIXED AIR OR SUPPLY AIR
RT2	SENSOR, REMOTE THERMOSTAT
A194	REFRIGERANT DETECTION BOARD

1. THERMOSTAT SUPPLIED BY USER
2. OPTIONAL WIRING FOR UNITS WITH ECONOMIZER
3. J3 MAXIMUM LOAD 20VA 24VAC CLASS II
4. TIME CLOCK CONTACTS (OPT) CLOSED OCCUPIED
5. TOUCHSCREEN THERMOSTAT
6. REMOVE JUMPER BETWEEN TB1-R AND TB1-OCP WHEN USING A NITE SETBACK THERMOSTAT

DENOTES OPTIONAL COMPONENTS
CLASS II FIELD WIRING

2022/09	WIRING DIAGRAM 538308-01	09/22
CONTROL		
ELECTRONIC/ELECTROMECHANICAL THERMOSTAT		
SECTION C		REV 0
Supersedes 537673-01	New Form No. 538308-01	

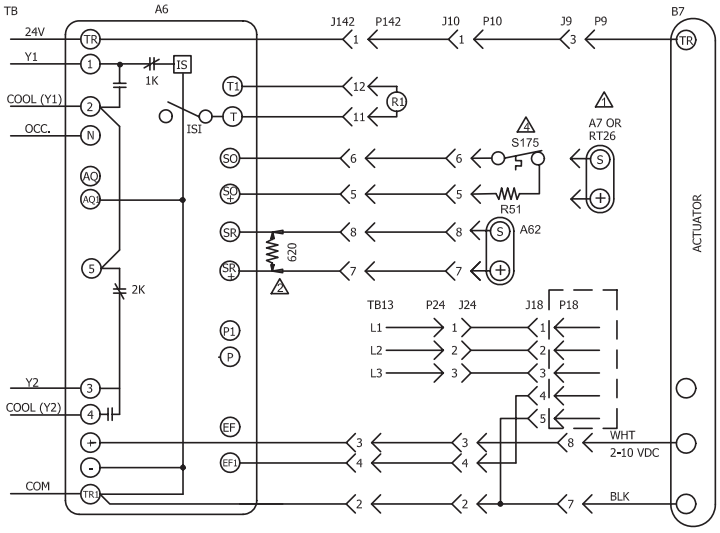
POWER:

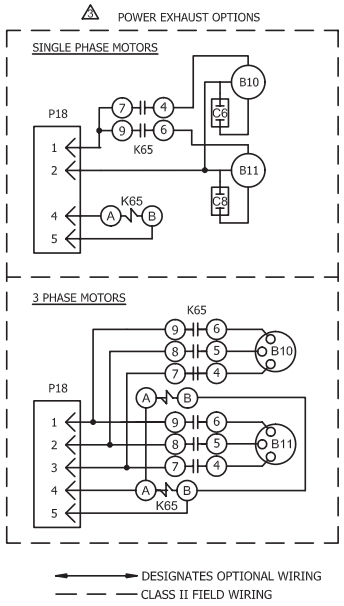
1- The A194 board energizes thermostat components with 24VAC.

OPERATION:

2- A194 receives data from the electronic thermostat A2 (Y1, Y2, W1, W2, G, OCP). The 24VAC signal from A194 energizes the appropriate components for heat or cool demand.

ECONOMIZER STANDARD EFFICIENCY





KEY	COMPONENT
A6	CONTROL-SOLID STATE ENTHALPY
A7	SENSOR-SOLID STATE ENTHALPY
A62	SENSOR-ENTHALPY, INDOOR
B7	MOTOR-DAMPER, ECONOMIZER
B10	POWER EXHAUST FAN 1
B11	POWER EXHAUST FAN 2
B43	MOTOR-EXHAUST DAMPER
C6	CAPACITOR, EXHAUST FAN 1
C8	CAPACITOR, EXHAUST FAN 2
K65	RELAY, EXHAUST FAN
R1	MIXED AIR SENSOR
R51	RESISTOR-SENSIBLE 820 OHM
RT26	SENSOR-OUTDOOR AIR TEMP
S175	THERMOSTAT-SENSIBLE TEMP 55-70F
TB13	TERMINAL STRIP, POWER DISTRIBUTION

J/P	DESCRIPTION
9	ECONOMIZER, MOTOR
10	ECONOMIZER
18	EXHAUST FAN COMPT.
24	EXHAUST FAN
142	ECONOMIZER HARNESS

1. RT26 OR A7 CAN BE USED IN PLACE OF S175 SENSOR. REMOVE R51 RESISTOR IF REPLACING S175 WITH RT26 OR A7
2. IF USING A DIFFERENTIAL ENTHALPY SENSOR, REMOVE 620 OHM RESISTOR
3. OPTION: POWER EXHAUST
4. REPLACE S175 WITH A7 OR RT26 AS OPTIONAL.

04/14	WIRING DIAGRAM 537674-01	04/14
ACCESSORIES		
ECONOMIZER		
SECTION D		REV. 0
Supersedes	New Form No. 537674-01	

SEQUENCE OF OPERATION

POWER:

1- A194 board energizes the economizer components with 24VAC.

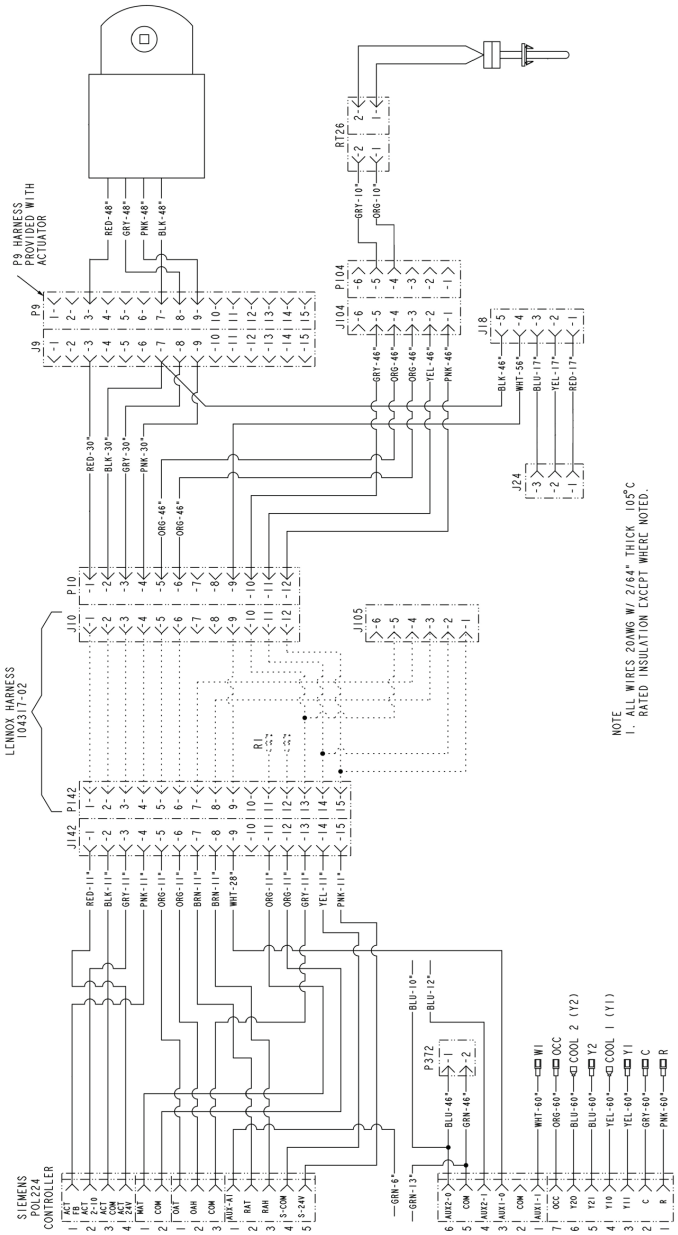
OPERATION:

2- Enthalpy sensor A7 and A62 (if differential enthalpy is used) communicates to the economizer control module A6 when to power the damper motor B7.

3- Economizer control module A6 supplies B7 with 0 - 10 VDC to control the positioning of economizer.

4- The damper actuator provides 2 to 10 VDC position feedback.

ECONOMIZER HIGH PERFORMANCE / LOW LEAK



SEQUENCE OF OPERATION

POWER:

1- A194 board energizes the economizer components with 24VAC.

OPERATION:

2- Enthalpy sensor A7 and A62 (if differential enthalpy is used) communicates to the economizer control module A6 when to power the damper motor B7.

3- Economizer control module A6 supplies B7 with 0 - 10 VDC to control the positioning of economizer.

4- The damper actuator provides 2 to 10 VDC position feedback.

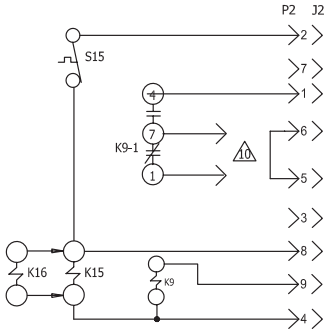
EHA-5, 7.5, 15, 22.5, 30kW
ZCD SERIES UNITS

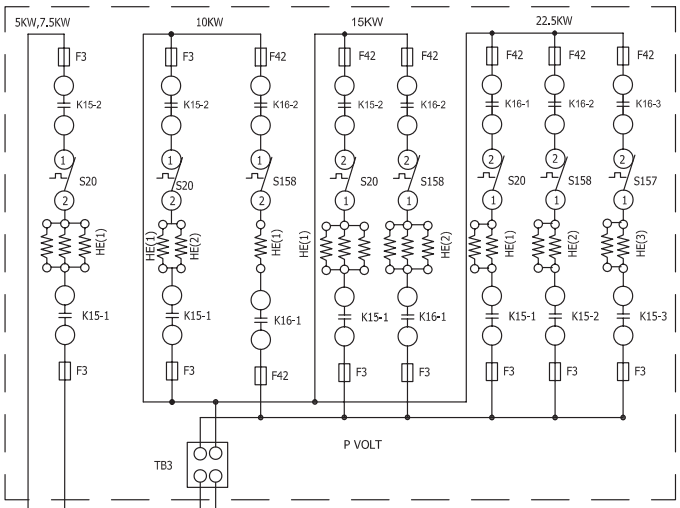
KEY	DESCRIPTION
F3	FUSE, ELECTRIC HEAT 1
F4	FUSE, UNIT
F42	FUSE, ELECTRIC HEAT 2
F43	FUSE, ELECTRIC HEAT 3
F44	FUSE, ELECTRIC HEAT 4
HE1	ELEMENT, ELECTRIC HEAT 1
HE2	ELEMENT, ELECTRIC HEAT 2
HE3	ELEMENT, ELECTRIC HEAT 3
HE4	ELEMENT, ELECTRIC HEAT 4
HE5	ELEMENT, ELECTRIC HEAT 5
HE6	ELEMENT, ELECTRIC HEAT 6
K9-1,2	RELAY, HEAT

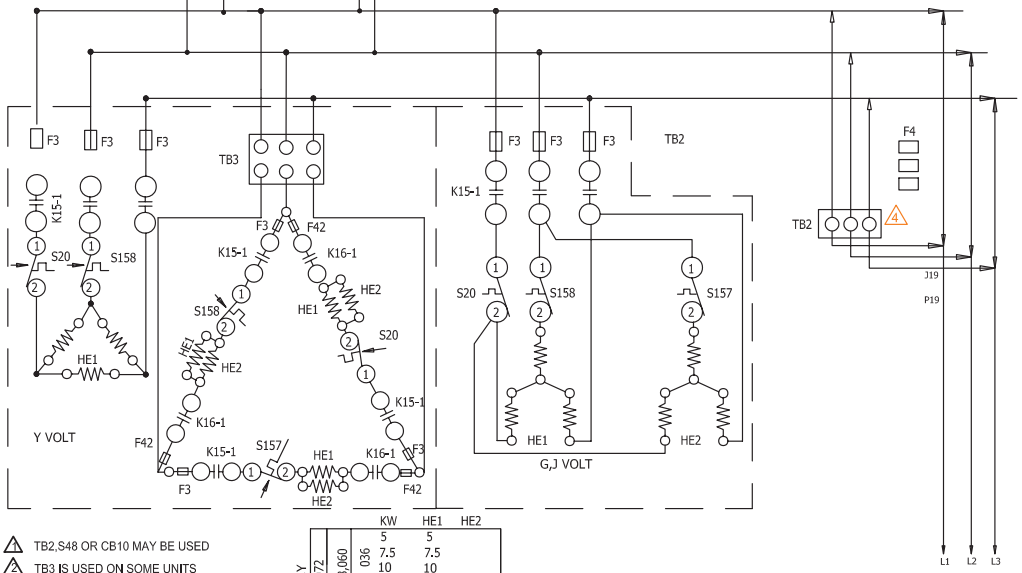
K15-1	CONTACTOR, ELECTRIC HEAT 1
K16-1	CONTACTOR, ELECTRIC HEAT 2
P2	PLUG, UNIT HEAT
S15	SWITCH, LIMIT PRIMARY ELECTRIC HEAT
S19	THERMOSTAT, ELECTRIC HEAT LIMIT
S20	SWITCH, LIMIT SECONDARY ELEC. HEAT 1 (NO RESET)
S157	SWITCH, LIMIT SECONDARY ELEC. HEAT 2 (NO RESET)
S158	SWITCH, LIMIT SECONDARY ELEC. HEAT 3 (NO RESET)
S159	SWITCH, LIMIT SECONDARY ELEC. HEAT 4 (NO RESET)
S160	SWITCH, LIMIT SECONDARY ELEC. HEAT 5 (NO RESET)
S161	SWITCH, LIMIT SECONDARY ELEC. HEAT 6 (NO RESET)
TB2	TERMINAL STRIP, UNIT
TB3	TERMINAL STRIP, ELECTRC HEAT

KW	HE1	HE2	HE3	HE4	HE5	HE6
7.5	7.5					
15	15					
22.5	15	7.5				
30	15	15				
45	15				15	15
60			15	15	15	15

P VOLT		KW	HE1	HE2	HE3
048,060	036	5	5		
		7.5	7.5		
		10		5	5
		15		7.5	7.5
		22.5	7.5	7.5	7.5







G,J,Y		KW	HE1	HE2
048,060	036	5	5	
		7.5	7.5	
		10	10	
		15	15	
	072	22.5	15	7.5
		30	15	15

⚠1 TB2,S48 OR CB10 MAY BE USED
⚠2 TB3 IS USED ON SOME UNITS

04/14	WIRING DIAGRAM 537690-01	04/14
	HEATING - ELECTRIC	
	5, 7.5, 15, 22.5, 30kW	
	SECTION A	REV 0
Supersedes	New Form No. 537690-01	

Sequence of Operation - EHA 7.5, 15, 22.5, 30, 45, 60 kW - Y and G, J, M

NOTE: *This sequence of operation is for all Electric Heat kW ratings Y through J voltages. Each step of operation is numbered and can be followed in sequence on the diagrams. Operation for G, J, and M voltages will be the same.*

HEATING ELEMENTS:

1 - Terminal Strip TB3 is energized when the unit disconnect closes. TB3 supplies line voltage to electric heat elements HE1 through HE6. Each element is protected by fuse F3, F42, F43, or F44.

FIRST STAGE HEAT:

2 - Heating demand initiates at W1 in thermostat.

3 - 24VAC W1 signal is routed from the thermostat through TB1 and P2-2. After S15 N.C. primary limit and S19 limit is proved, the electric heat 1 contactor K15 is energized.

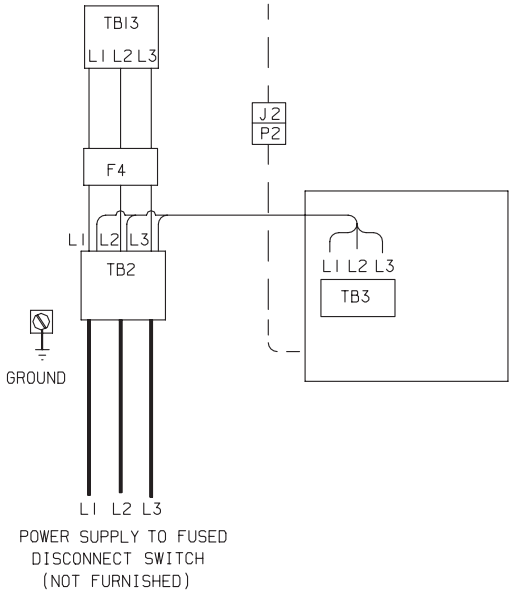
4 - If S20 and S157 (S158 on Y-volt units) secondary electric heat limits remain closed, HE1 and HE2 (HE3 and HE4 on Y-volt units) electric heat is energized.

SECOND STAGE HEAT:

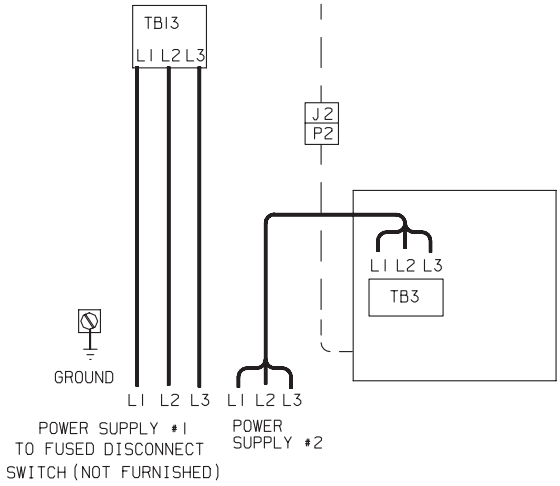
5 - Heating demand initiates at W2 in thermostat.

6 - 24VAC W2 signal is routed from the thermostat through TB1 and P2-7. Electric heat contactor K16 is energized.

7 - If S158 and S159 (S159, S160 and S161 on Y-volt units) secondary electric heat limits remain closed, HE3 and HE4 electric heat is energized.

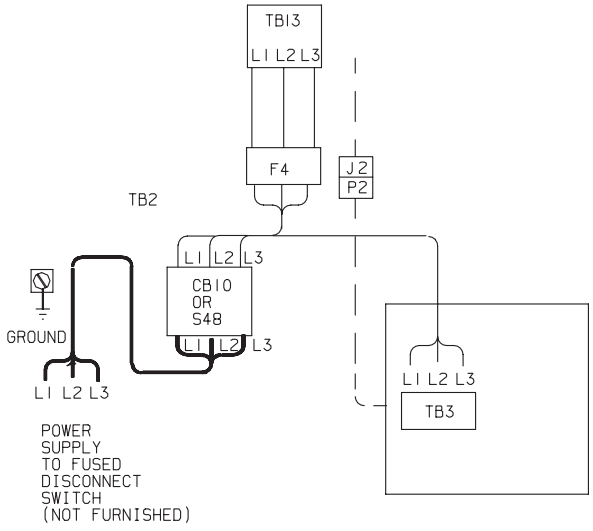


SINGLE POWER SUPPLY - NO CB10 OR S48

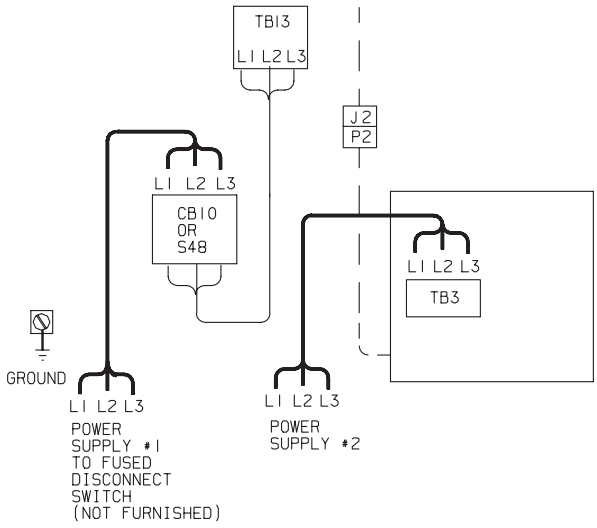


MULTIPLE POWER SUPPLY - NO CB10/S48

CB10-Circuit Breaker
F4- SPPS Terminal Block
J2- Low Voltage Control Harness
J3- Electric Heat Control Harness
S48- Disconnect
TB2- SPPS Terminal Block
TB3- Electric Heat Terminal Block
TB13- Unit Terminal Block



SINGLE POWER SUPPLY WITH CB10/S48



MULTIPLE POWER SUPPLY WITH CB10/S48

IX-Decommissioning

Before carrying out this procedure, it is essential that the technician is completely familiar with the equipment and all its detail. It is recommended good practice that all refrigerants are recovered safely.

Prior to the task being carried out, an oil and refrigerant sample shall be taken in case analysis is required prior to re-use of recovered refrigerant. It is essential that electrical power is available before starting decommissioning.

a) Become familiar with the equipment and its operation.

b) Isolate system electrically.

c) Before attempting the procedure, ensure that:

- mechanical handling equipment is available, if required, for handling refrigerant cylinders;
- all personal protective equipment is available and being used correctly;
- the recovery process is supervised at all times by a competent person;
- recovery equipment and cylinders conform to the appropriate standards.

d) Pump down refrigerant system, if possible.

e) If a vacuum is not possible, make a manifold so that refrigerant can be removed from various parts of the system.

f) Make sure that cylinder is situated on the scales before recovery takes place.

g) Start the recovery machine and operate in accordance with instructions.

h) Do not overfill cylinders (no more than 80% volume liquid charge).

i) Do not exceed the maximum working pressure of the cylinder, even temporarily.

j) When the cylinders have been filled correctly and the process completed, make sure that the cylinders and the equipment are removed from site promptly and all isolation valves on the equipment are closed off.

k) Recovered refrigerant shall not be charged into another REFRIGERATING SYSTEM unless it has been cleaned and checked.

⚠ IMPORTANT

Equipment shall be labelled stating that it has been decommissioned and emptied of refrigerant. The label shall be signed and dated. Ensure that there are labels on the equipment that state the flammability of the refrigerant used.